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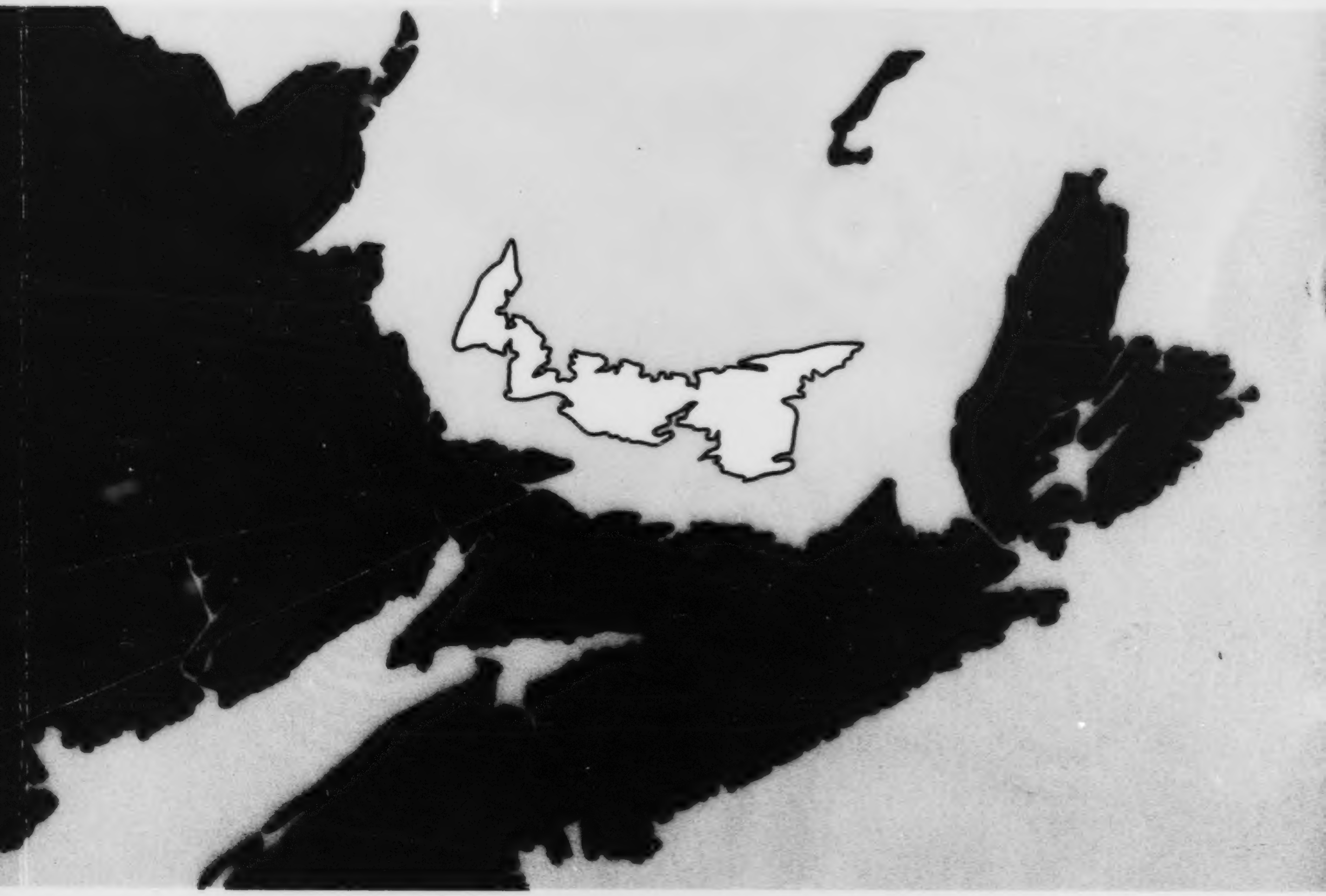
Soils of Prince Edward Island

Prince Edward Island Soil Survey 1988



Canada

Soils of Prince Edward Island

Prince Edward Island Soil Survey

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CONTENTS

ACKNOWLEDGMENTS vii

PREFACE viii
SUMMARY ix

GENERAL DESCRIPTION OF THE AREA 1
- Location and extent 1
- Climate 1
- Physiography, bedrock geology, and surficial deposits 7
- Drainage 15
- Vegetation 16

METHODS OF SURVEY 17
- Detailed maps and map units 17
- Map symbol coding on the detailed maps 18
- Generalized maps 23
- The soil profile 23
- Soil formation and classification 27
- The formation and classification of Prince Edward Island soils 31

DESCRIPTION OF THE SOILS 34
- Abney Road association 34
- Alberry map unit 35
- Arlington association 36
- Baptist Point map unit 37
- Brackley map unit 28
- Bunbury map unit 39
- Canavoy association 41
- Carey Point map unit 41
- Charlottetown map unit 42
- Crapaud map unit 44
- Culloden map unit 45
- Dunblane map unit 46
- Dunstaffnage map unit 47
- Duvar map unit 48
- Egmont map unit 49
- Emyvale map unit 50
- Enmore association 51
- Fifteen Point map unit 52
- Frenchfort association 53
- Gowanbrae map unit 54
- Haliburton map unit 55
- Haliburton Brook map unit 56
- Hazelbrook association 57
- Hebron map unit 58
- Kildare map unit 59
- Lake Verde association 60
- Locke Road map unit 61
- Malpeque map unit 62
- Margate map unit 63

Mossy Point map unit 65
Munn Road map unit 66
Newton map unit 67
O'Leary map unit 67
Orwell map unit 69
Pisquid association 70
Pownal association 71
Rocky Point map unit 72
Salt Grass Point map unit 73
Tignish map unit 74
Uigg map unit 75
West Point map unit 76
Winsloe map unit 78
Wolfe Inlet map unit 79
Wood Island map unit 80

DESCRIPTION OF MISCELLANEOUS LAND TYPES 82
Coastal Beach map unit 82
Dune Sand map unit 82
Stream Complex map unit 83
Airport, cemetary land, steep land, and pit map units 83
Salt Marsh map unit 83

LAND USE 84
Present land use 84
Interpretation of soils for agriculture 89
Capability classification and interpretative ratings for forestry ... 101
Engineering aspects and land use planning 116

SOILS AND COMMUNITY DEVELOPMENT 136
Soil limitation ratings for septic filter fields 136
Soil limitation ratings for housing 136
Soil limitation ratings for area-type sanitary landfill 140
Soil limitation ratings for recreation 140

ORGANIC SOILS OF PRINCE EDWARD ISLAND 156
Definition and peatland formation 156
Some characteristics and kinds of peat material 158
Peat landform classification 159
Classification and organic soil associations 161
Use of organic soils 162

REFERENCES 189

APPENDIXES

Appendix 1. Definition of descriptive terms 191
Appendix 2. Unified soil classification system 194
Appendix 3. Methods of analyses 196
Appendix 4. Interpretation of analyses 197
Appendix 5. Names of native plants used in the text 200
Appendix 6. Indexes for maps of selected soil features or of soil interpretations, and for soil maps with photobase (Figs. 17 and 18). 202

GLOSSARY 205

LIST OF ILLUSTRATIONS AND TABLES

FIGURES

1. Location and extent 2
2. Average corn heat units 3
3. Average slope 8
4. Geological map of Prince Edward Island 9
5. Surficial deposits of Prince Edward Island 13
6. Diagram of a soil profile 26
7. Plate showing four soil profiles
a) Typical Humo-Ferric Podzol, Alberry series; (b) Ortstein Humic Podzol, Wood Island series; (c) Podzolic Gray Luvisol, Tignish series; (d) Gleyed Gray Luvisol, Duvar series 28
8. Alberry soils on undulating landscape 29
9. Charlottetown soils on gently undulating landscape 29
10. Culloden soils on undulating landscape 29
11. Typical landscape on Tignish-O'Leary soils 30
12. Sand dunes, Brackley, P.E.I. 30
13. Erosion frequently occurs during spring runoff 30
14. Comparison of particle size classes by pedologists or engineers 120
15. Diagrammatic representation of depth relationships involved in organic soil classification 157
16a. A diagram showing the ranges in percentages of sand, silt, and clay in the soil textural classes 192
16b. Unified soil classification system 195
17. Maps of selected soil features or of soil interpretations may be specified by using this index 203
18. Soil maps with photobase may be specified by using this index 204

TABLES

1. Monthly averages of daily maximum and daily minimum air temperatures (°C) at Charlottetown (CDA) and Fredericton (CDA) 4
2. Mean monthly air temperature (°C), total precipitation (mm), and snowfall (cm) at three locations in Prince Edward Island 4
3. Mean monthly soil temperatures (°C) at 15 cm depth and duration of bright sunshine (hours) at three locations in Prince Edward Island .. 5
4. Average date of last spring frost (°C, or lower), first fall frost, and length of frost-free period (days) at seven locations in Prince Edward Island 5
5. Degree-days above 5.0°C and heat units available for corn production at three locations in Prince Edward Island 6
6. Key to the soils of Prince Edward Island and their extent 20
7. Definition of soil horizons pertinent to Prince Edward Island 24
8. Classification of the soils 32
9. Hectares of land under various uses, and the number and size of farms in representative years 1931 to 1981 86
10. Number of farms of various sizes in representative years 1931 to 1981 86
11. Number of livestock in representative years 1931 to 1981 87
12. Hectares under main crops in representative years 1931 to 1981 87
13. Forest inventory, volume, and biomass summary for Prince Edward Island, 1981 88
14. Soil capability classes, and their extent and limitations for vegetable and field crops 93

15. Soil limitations for vegetable crops - guideline criteria 97
16. Soil limitations for field crops - guideline criteria 98
17. Interpretation of Classes 2, 3, and 4 soils for some agricultural crops 99
18. Soil limitations for access road construction - guideline criteria .. 104
19. Soil limitations for equipment use - guideline criteria 105
20. Soil susceptibility to erosion - guideline criteria 106
21. Soil susceptibility to windthrow - guideline criteria 107
22. Capability classification and degree of limitation affecting forestry use 108
23. Interpretations of soil groups for tree growth suitability and suitability for lowbush blueberry 117
24. Engineering groups of Prince Edward Island soil groups 122
25. Engineering test data for Prince Edward Island soil groups 124
26. Engineering interpretations of soil for some uses 128
27. Soil limitations for septic filter fields - guideline criteria 137
28. Soil limitations for septic filter fields 138
29. Soil limitations for housing - guideline criteria 141
30. Soil limitations for buildings with basements 143
31. Soil limitations for area-type sanitary landfill - guideline criteria 145
32. Soil limitations for area-type sanitary landfill 146
33. Soil limitations for athletic fields - guideline criteria 148
34. Soil limitations for outdoor living - guideline criteria 150
35. Soil limitations for recreational purposes 152
36. Classification and area of organic soils in Prince Edward Island 162
37. Chemistry of organic soil water collected between a depth of 20 and 50 cm 168
38. Analysis of organic soils in Prince Edward Island 169
39. Particle size analyses of mineral soil profiles as percentages of oven dry weights 171
40. Chemical properties of mineral soil profiles as percentages of oven dry weights 178
41. Bulk density (BD), water retention, and saturated hydraulic conductivity (K) determinations from cores of Prince Edward Island mineral soils 184
42. Minerals in the clay fraction (<2 μm)of selected horizons of four Prince Edward Island soils 188

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PREFACE

A preliminary, or interim, report was published in 1981 primarily for use with the detailed 1:10 000 scale soil maps as they became available. The last of the 355 detailed maps was completed by the Cartographic Section of Land Resource Research Centre, Ottawa, in 1983. Generalized maps in color were then prepared from the detailed map set and these are enclosed at the back of this report. This is a final report for the project and deals with the soils in more detail. It is suitable for use with both map sets. The detailed maps are retained on open file in the soil survey office where they may be examined, or requests for area sheets can be accommodated.

The report begins with a discussion of the geographical setting of the soils, climate, geology, landforms, vegetation, and drainage. The second section discusses soil formation and classification, explains mapping procedures, map preparation and symbolization, and how to request detailed maps. This section is followed by map unit and profile descriptions.

The section on land use includes present farming trends, farm and forest production, and capability ratings of the various soils to support agriculture and forestry based on soil-limiting factors. Nonagricultural land uses are briefly discussed in the sections on Engineering aspects and land use planning and Soils and community development. The classification, capability, and land use possibilities of organic soils on Prince Edward Island are discussed in a separate section.

The Appendixes include a definition of descriptive terms used in the report, tables on analytical data, an aid to interpretation of analytical data, and map indexes. A glossary of soil science terms used in the report is also included.

SUMMARY

Prince Edward Island has a land area of 575 000 ha. It is located in the Gulf of St. Lawrence, about 15 km by ferry to the New Brunswick coast at Cape Tormentine, and about 23 km from the north shore of Nova Scotia.

The climate is characterized by January and July mean temperatures of -7°C and 18.7°C, respectively, and an annual precipitation of 900 to 1000 mm, of which 180 to 250 mm, expressed as water equivalent, is snowfall. Precipitation is evenly distributed over the year. The frost-free period ranges from 100 to 160 days.

The general relief is undulating. A hilly area bisects the central part of the province and contains the highest point of elevation of 139 m above sea level (A.S.L.). About 75% of the land surface is less than 45 m A.S.L.

Two soil map sets have been prepared. Detailed maps at 1:10 000 scale are retained on open file in the soil survey office, and generalized maps at 1:75 000 scale are placed with this report.

Forests, now covering about half the island, have been heavily exploited. Improved land for agriculture makes up about 35% of the land area. The chief agricultural soils are in the Charlottetown, Alberry, Culloden, Tignish, O'Leary, and Haliburton map units. About 70% of the land area consists of well-drained or moderately well drained soils that are dominantly Podzols. About 9% consists of imperfectly drained Brunisols, 18% consists of poorly drained Gleysols, and about 1% consists of Organic soils. About 57% of the total land area is in Canada Land Inventory (CLI) Capability Class 2 or 3, soils deemed suitable for sustained agricultural production.

Livestock farming and potato growing provide the main sources of farm income. Aside from potatoes, most of the other crops grown are required for livestock feed. Crops for processing, small fruits including blueberries, and tobacco provide additional sources of farm income.

Major management problems in the use of the soils for agriculture are the requirement for lime and fertilizer throughout rotations, and the erosion of topsoil, which occurs during spring runoff mainly from soils left unprotected by vegetation or other conservation measures.

For engineering purposes, attention has been focused on material below the solum. Most of the subsoils can be described as dense, with low water content, high shear resistance, and low compressibility.

Profiles representing the soil series are described in detail. Analyses show most of the soils to be strongly acid, and organic matter levels to be relatively low. Cation-exchange capacities and base saturation are generally low and base-unsaturated in most soils. The accumulation of Fe, Al, and organic material in the upper B horizon depends on good profile drainage.

GENERAL DESCRIPTION OF THE AREA

Location and extent

Prince Edward Island is located in the Gulf of St. Lawrence between N 45°57' and N 47°04' and W 61°55' and W 64°25'. It is crescent-shaped, about 230 km long, 6 to 30 km wide, and has a coastline of 1600 km and an area of 575 000 ha (Fig. 1). The shortest distance to New Brunswick is 15 km and to Nova Scotia about 23 km.

Climate

The cool, humid climate is controlled mainly by continental air masses that are humidified and temperature-moderated by the surrounding ocean waters. Winters are relatively long with a slow gradual changeover through spring to moderately warm summers. Precipitation is normally abundant and relatively evenly distributed throughout the year. The average frost-free period ranges from about 150 days near the coast and on land with relatively high elevation to less than 100 days in low-lying inland areas.

The general expression is one of rapid change from warm to cold, sunny or cloudy, with rain or snow on an average of slightly less than half the days of the year. The average amount of bright sunshine is 7-8 hours per day in summer and 3-4 hours per day in winter.

The moderating effect of the sea on daily maximum and minimum temperatures at Charlottetown, P.E.I., versus Fredericton, N.B., 400 km west, is compared in Table 1.

During spring and summer (March to August) daily maximum temperatures are 2 to 3 degrees lower at Charlottetown than at Fredericton, whereas in late fall and early winter (November to January) they are 1 to 2 degrees higher (Table 1). Nighttime minimum temperatures are consistently higher at Charlottetown than at Fredericton throughout the whole year but especially so in fall and early winter. Thus, the influence of the ocean water delays the spring, extends the fall, and reduces the diurnal temperature range. Sea ice during spring breakup may surround the island and remains very late, depending on prevailing winds; it has a significant cooling effect.

The coldest months are January and February with means of about -7°C. Short warm periods caused by influx of subtropical air during these months may at times cause a rapid temperature change of 40 degrees or more. July and August have mean temperatures near 19°C.

The growing season is rather cool but usually extends from early May to the end of October. It is well suited to the production of perennial pasture and forage crops. The relatively long frost-free period allows a wide range in the kinds of crops grown, but the rather cool growing season emphasizes the importance of concentrating on cool-weather crops and developing early maturing varieties.

Tables 2 to 5 and Fig. 2 are summaries of climatic data for various stations in Prince Edward Island. This section was prepared and reviewed by Mr. A. Bootsma, climatologist, formerly Prince Edward Island Department of Agriculture and Forestry but now at the Land Resource Research Centre, Agriculture Canada, Ottawa.

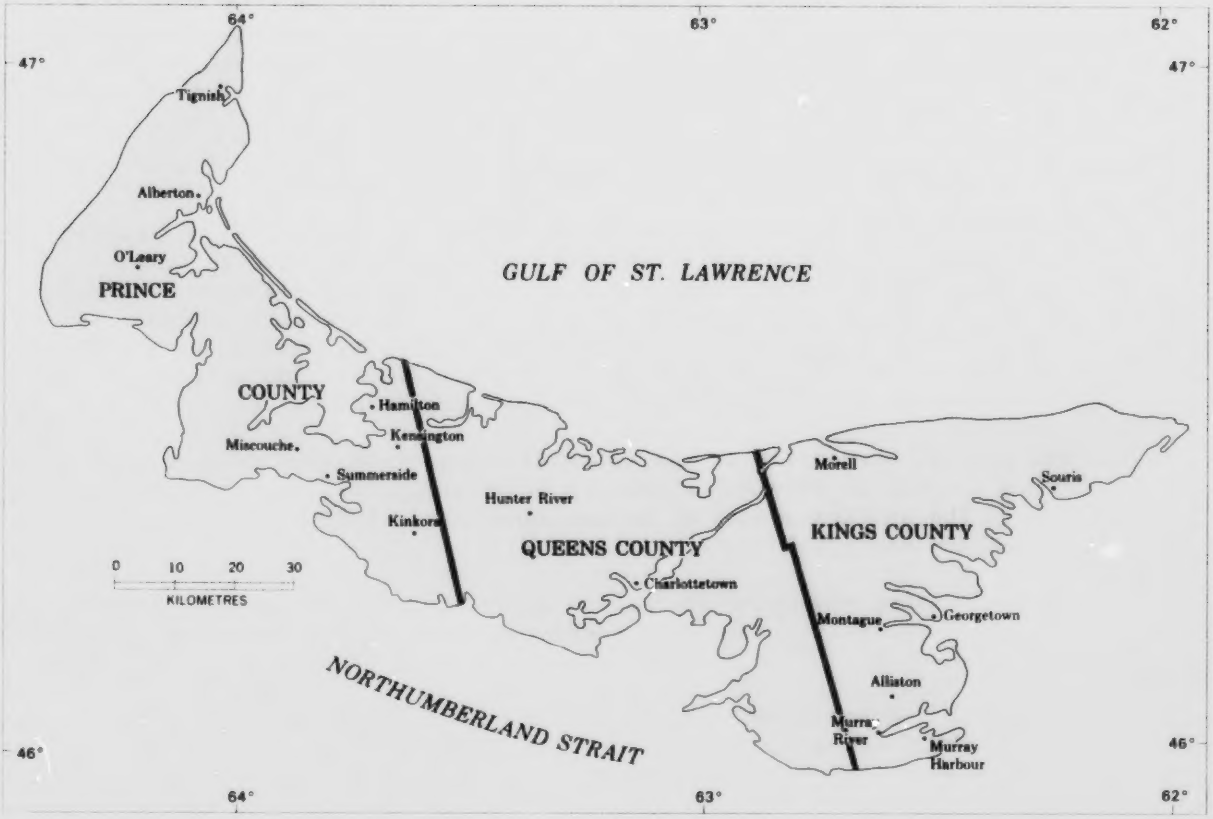
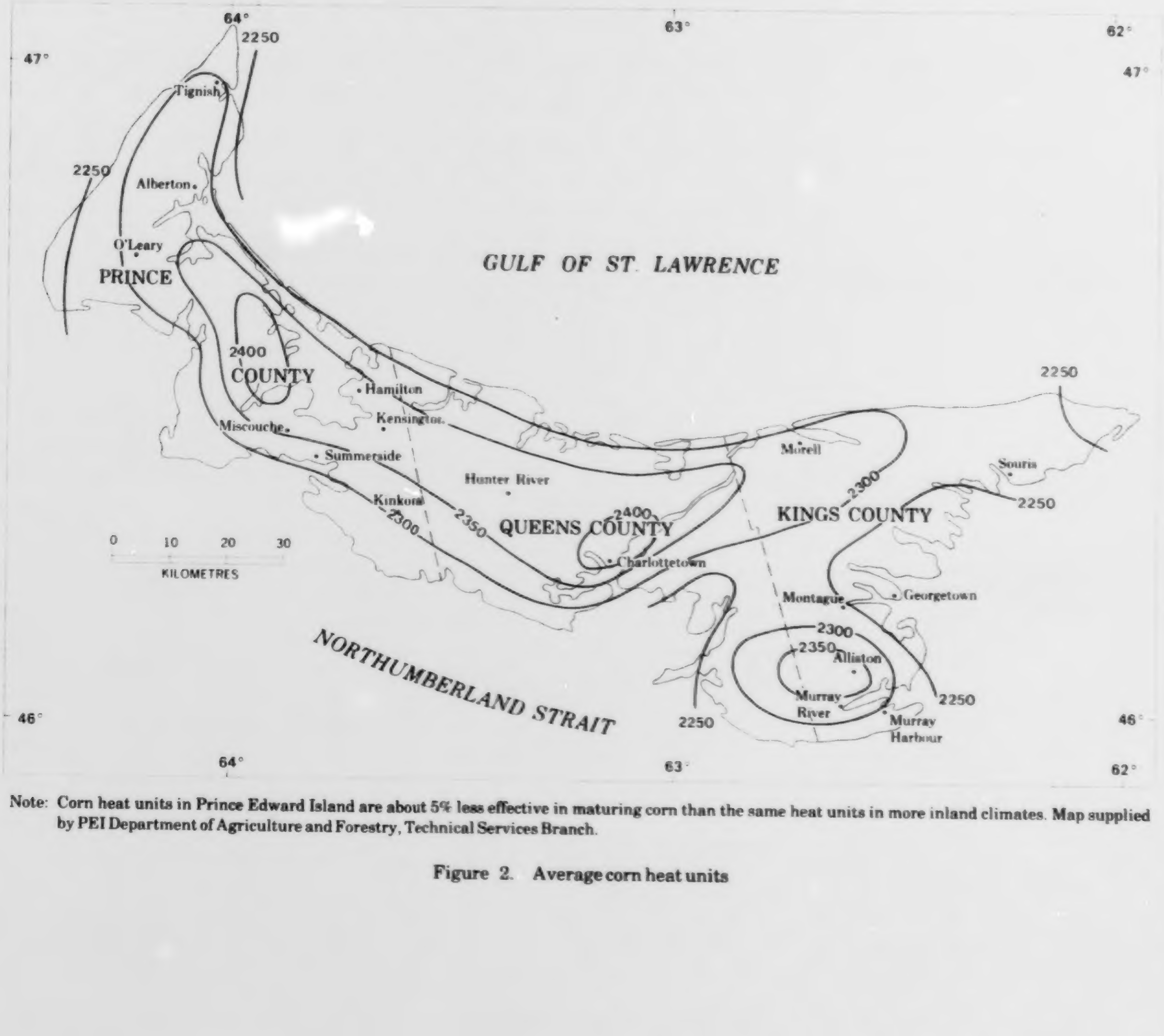

64°
63°
62°
47°
46°
Tignish
Alberton
O'Leary
PRINCE
COUNTY
GULF OF ST. LAWRENCE
Hamilton
Kensington
Miscouche
Summerside
Kinkora
Hunter River
QUEENS COUNTY
Charlottetown
Morell
Souris
KINGS COUNTY
Montague
Georgetown
Alliston
Murray River
Murray Harbour
0 10 20 30
KILOMETRES
NORTHUMBERLAND STRAIT

Figure 1. Location and extent


64°
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62°
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2250
Tignish
2250
Alberton
O'Leary
PRINCE
COUNTY
2400
GULF OF ST. LAWRENCE
Hamilton
Kensington
Miscouche
Summerside
Hunter River
Kinkora
2300
2350
QUEENS COUNTY
2400
Charlottetown
2250
Morell
2300
Souris
2250
KINGS COUNTY
Montague
Georgetown
2300
2350
Alliston
Murray River
Murray Harbour
2250
2250
0
10
20
30
KILOMETRES
NORTHUMBERLAND STRAIT
46°
46°
64°
63°
62°

Note: Corn heat units in Prince Edward Island are about 5% less effective in maturing corn than the same heat units in more inland climates. Map supplied by PEI Department of Agriculture and Forestry, Technical Services Branch.

Figure 2. Average corn heat units

Table 1. Monthly averages of daily maximum and daily minimum air temperatures (°C) at Charlottetown (CDA) and Fredericton (CDA)*

		J	F	M	A	M	J	J	A	S	O	N	D
Charlottetown	(max.)*	-2.7	-2.7	0.8	6.9	14.0	19.5	23.6	22.8	18.8	12.9	6.9	0.1
	(min.)	-10.4	-10.9	-6.3	-1.1	4.4	9.7	14.4	14.1	10.3	5.3	.5	-6.6
Fredericton	(max.)	-4.1	-2.6	2.5	9.5	16.9	22.2	25.4	24.2	19.6	13.3	5.9	-1.8
	(min.)	-14.4	-14.4	-7.8	-1.5	4.0	9.2	12.7	11.8	7.6	2.5	-2.3	-10.9

*Data are 1941-1970 normals published by Environment Canada, Atmospheric Environment Services, Downsview, Ontario. Measurements at Agriculture Canada Research Station (CDA).

Table 2. Mean monthly air temperature (°C), total precipitation (mm), and snowfall (cm) at three locations in Prince Edward Island*

	Summerside (CDA)			Charlottetown (CDA)			Alliston		
Month	Mean	Total	Snowfall	Mean	Total	Snowfall	Mean	Total	Snowfall
Jan.	-7.4	84.6	45.0	-6.6	97.5	68.6	-6.1	74.4	42.9
Feb.	-7.3	74.4	45.0	-6.8	82.3	59.9	-6.6	64.5	43.7
Mar.	-3.1	68.8	35.8	-2.7	76.5	45.0	-2.7	61.5	32.3
Apr.	2.8	80.0	17.0	2.9	74.7	19.8	2.8	69.1	17.0
May	9.0	79.0	1.0	9.2	79.5	1.3	8.8	71.4	0.8
Jun.	14.3	82.6		14.7	79.0		14.2	68.1	
Jul.	18.7	78.7		19.1	74.2		18.7	61.5	
Aug.	18.2	83.6		18.5	90.2		18.1	87.1	
Sep.	14.6	81.5		14.6	92.5		14.4	82.6	
Oct.	8.8	89.9	0.3	9.2	98.6	1.0	9.1	78.0	0.3
Nov.	3.2	108.5	7.6	3.7	114.6	11.7	3.8	102.6	8.4
Dec.	-3.9	87.6	36.3	-3.2	99.6	53.9	-2.9	80.3	37.9
Year	5.7	999.2	188.0	6.1	1059.2	261.2	6.0	901.1	183.3

*Total precipitation includes water equivalent of snowfall. Data are 20- to 30-year averages during 1941-1970 normal period, published by Environment Canada, Atmospheric Enviroment Service, Downsview, Ontario. Summerside (CDA), Canada Department of Agriculture site, now closed.

Table 3. Mean monthly soil temperatures (°C) at 15 cm depth and duration of bright sunshine (hours) at three locations in Prince Edward Island

	O'Leary		Charlottetown		East Baltic	
Month	Soil temp.	Bright sunshine	Soil temp.	Bright sunshine*	Soil temp.	Bright sunshine
Jan.	-0.6	111	-0.7	83	-1.5	84
Feb.	-1.1	127	-1.3	105	-2.6	116
Mar.	-0.5	150	-1.0	137	-1.5	126
Apr.	0.7	158	0.2	156	-0.3	151
May	5.8	222	7.0	199	4.9	222
Jun.	13.1	227	13.4	215	12.2	233
Jul.	16.7	258	17.2	244	16.5	257
Aug.	16.8	254	17.3	220	16.6	254
Sep.	13.0	167	13.6	180	13.1	159
Oct.	8.0	131	8.9	133	8.3	122
Nov.	3.5	105	4.4	72	3.8	82
Dec.	0.5	68	0.9	59	0.5	51
Year	6.3	1978	6.7	1803	5.8	1857

* Taken from Yorke, B.J., and G.R. Kendall. Daily bright sushine 1941-1970. Environment Canada, Atmospheric Environment Service, Downsview, Ontario, 1972. All other data are 1972-1978 averages supplied by Prince Edward Island Department of Agriculture and Forestry, Technical Services Branch.

(CDA): Agriculture Canada

Table 4. Average date of last spring frost (0°C or lower), first fall frost and length of frost-free period (days) at seven locations in Prince Edward Island

Station	Last spring frost	First fall frost	Frost-free period
Summerside airport[1]	May 13	Oct. 21	160
Charlottetown CDA[1]	May 16	Oct. 16	152
Alliston[1]	May 21	Oct. 18	149
O'Leary	May 28	Oct. 11	135
New Glasgow	May 31	Sep. 28	119
Lower Freetown	Jun. 2	Sep. 22	111
Albion Cross	Jun. 10	Sep. 19	100

[1] Data for these stations are from the 1941-1970 normal period, supplied by Environment Canada, Atmospheric Environment Service. All other locations are 1972-1978 averages compiled by Prince Edward Island Department of Agriculture and Forestry, Technical Services Branch.

CDA: Agriculture Canada.

Table 5. Degree days above 5.0°C and heat units available for corn production at three locations in Prince Edward Island

Location	Degree-days[1] (May-October)	Corn heat units[2] (June-September)
Summerside airport	1712	2348
Charlottetown CDA[3]	1723	2437
Alliston	1677	2361

[1] Derived from Handbook on agricultural and forest meteorology, R.A. Treidl, editor. Fisheries and Environment Canada, Atmospheric Environment. 1978.

[2] Compiled by Prince Edward Island Department of Agriculture and Forestry, Technical Services Branch. Technical Services Branch.

[3] CDA: Agriculture Canada.

Physiography, bedrock geology, and surficial deposits

Prince Edward Island, along with the other Maritime Provinces and part of Quebec, lies within the Appalachian mountain system that extends almost to Texas. The Canadian portion of this system exhibits the southwest to northeast structural trend of the system in general, and divides naturally into a number of physiographic units that coincide with major geological formations.

One of these units is the Maritime Plain, a broad triangular-shaped basin almost entirely submerged by the Gulf of St. Lawrence. This lowland plain is underlain by late Paleozoic sedimentary rocks that emerged in the southern part of the Gulf of St. Lawrence to form the Maritime Plain sections of New Brunswick, Nova Scotia, all of Prince Edward Island, and the Magdalen Islands. Thus, the flat-lying Permocarboniferous beds of Prince Edward Island are a remnant portion now separated by the waters of the Gulf of St. Lawrence and Northumberland Strait from the other units of the Maritime Plain.

The island's relief is undulating. Though similar to the other lowland units, it is in general more subdued, with a maximum amplitude of less than 60 m. Two sections are hilly; one crosses the central part of the province and is called the Central Hill Lands, the other occurs in the southeastern part of the province (Fig. 3). West of the Central Hill Lands the relief is gently undulating but becomes more subdued, or level, west of Summerside. East of the Central Hill Lands the relief undulates repetitively. About 75% of the land surface is less than 45 m A.S.L. The highest elevation of 139.5 m occurs in the central part of the province. Although modified by glaciation, the major relief and hydrologic features were established or controlled by bedrock structural trends.

The geology of Prince Edward Island has been investigated by various workers since the middle of the last century. The most recent report by H.W. van de Poll covers two full seasons of field work and unifies many aspects of the previous reports. The following summary, including geology and map (Fig. 4), is in part from the abstract of his report (20) but includes a summary of the lithological descriptions taken from the main body of his report.

Prince Edward Island is a crescent-shaped, low-angle cuesta of Upper Pennsylvanian to Early Permian redbeds, dipping to the northeast at an average of 1 to 3 degrees.

Lithostratigraphic subdivision of the redbeds is facilitated by the presence of four major cyclic sequences, informally designated Megacyclic sequences I to IV. Each sequence is 300 to 400 m thick and consists of a relatively coarse conglomerate base, fining upward through coarse to fine sandstone-siltstone alterations to very fine sandstone and siltstone at the top. Each megacyclic sequence comprises repeated fluvial cycles up to 20 m thick.

The overall sediment transport direction (cross-bedding) of the Prince Edward Island redbeds is 047 degrees.

Mild deformation of the strata is on an easterly and northeasterly trending axis and can be attributed to uplift of a buried basement horst (Kingston Uplift) extending from New Brunswick into Prince Edward Island and from salt diastrophism at depth.

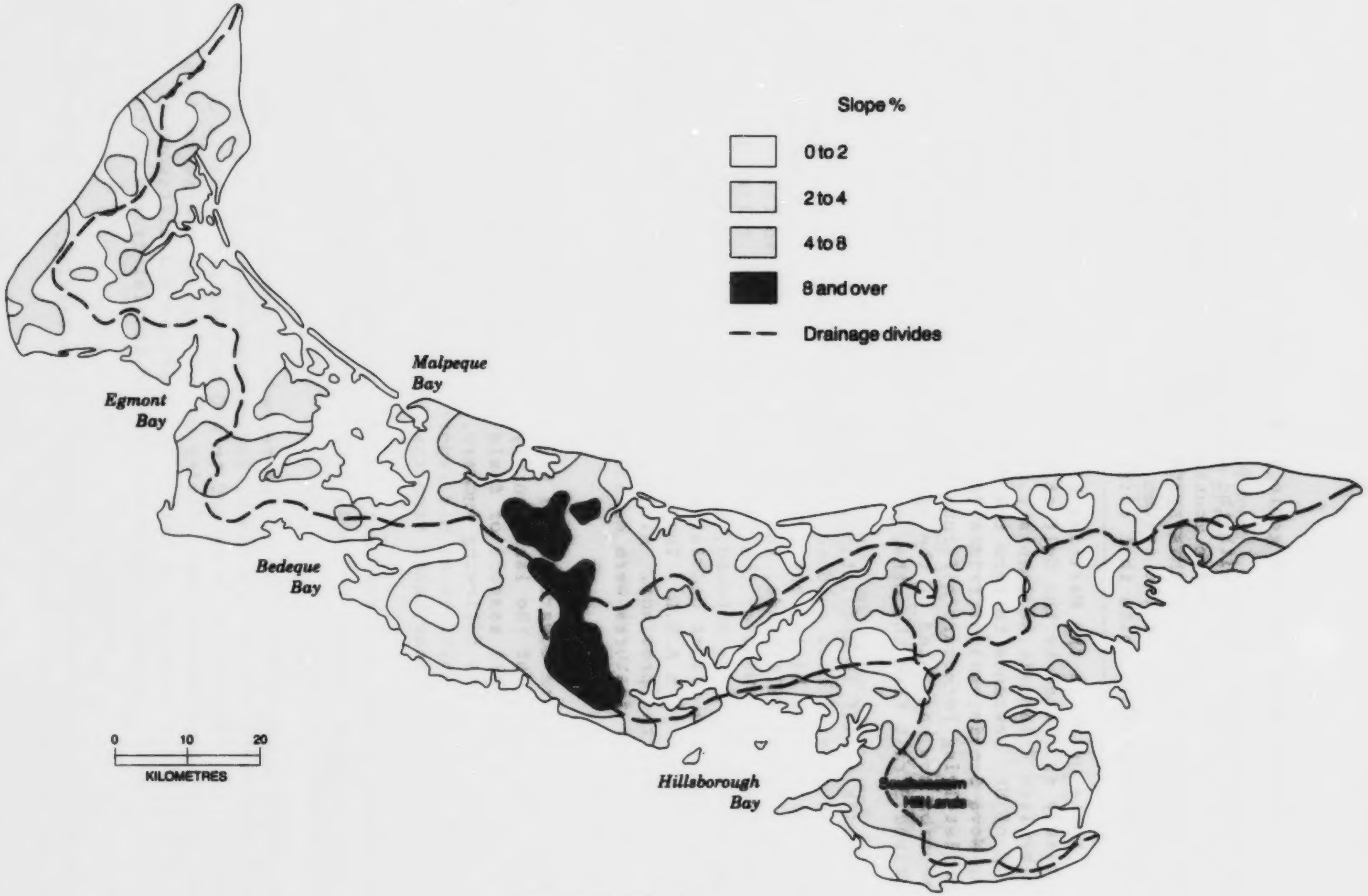
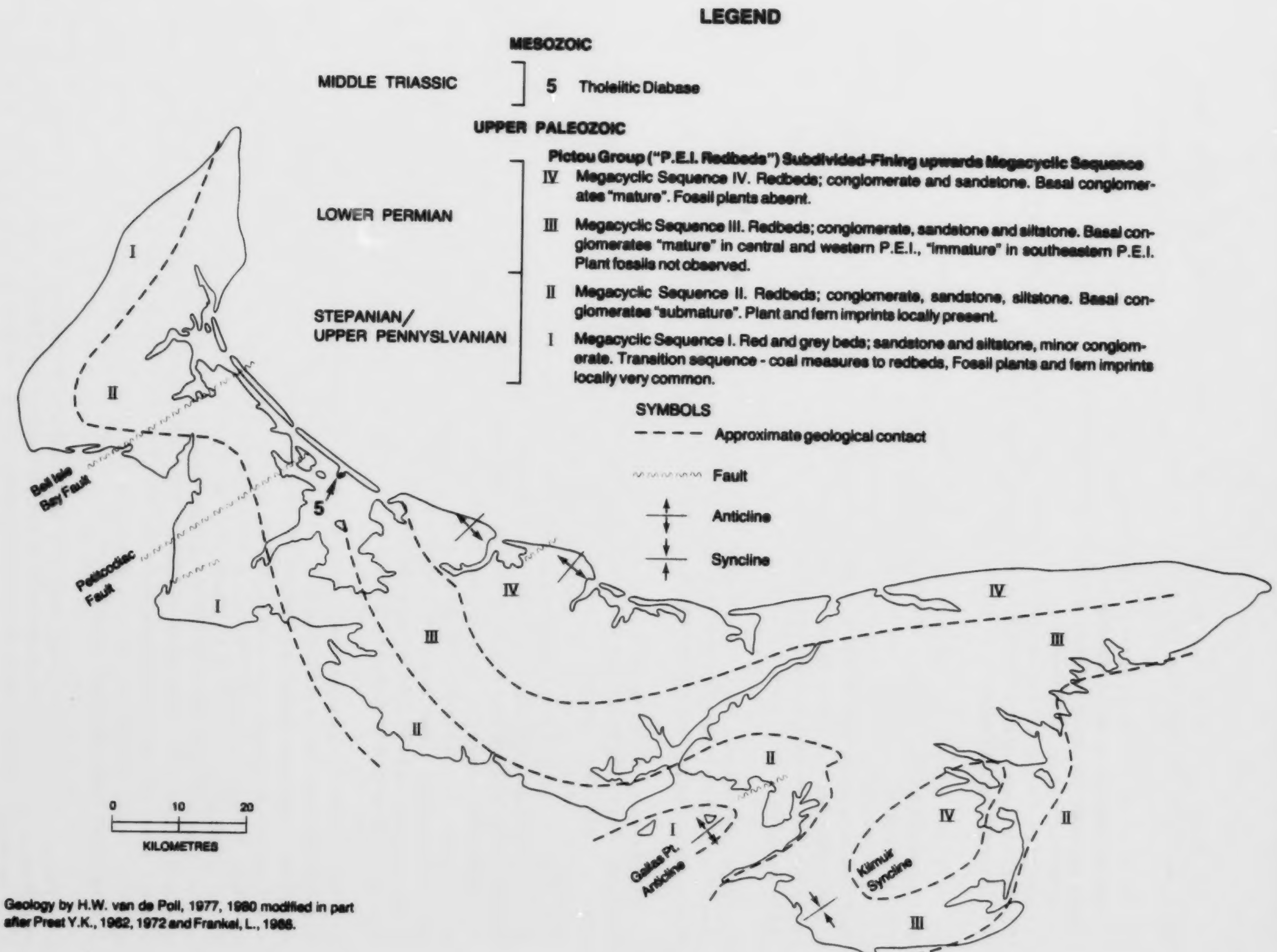

Slope %
0 to 2
2 to 4
4 to 8
8 and over
Drainage divides
Malpeque Bay
Egmont Bay
Bedeque Bay
Hillsborough Bay
Southeastern Hill Lands
0
10
20
KILOMETRES

Figure 3. Average slope


LEGEND
MESOZOIC
MIDDLE TRIASSIC
5 Tholeiitic Diabase
UPPER PALEOZOIC
Pictou Group ("P.E.I. Redbeds") Subdivided-Fining upwards Megacyclic Sequence
LOWER PERMIAN
IV Megacyclic Sequence IV. Redbeds; conglomerate and sandstone. Basal conglomerates "mature". Fossil plants absent.
III Megacyclic Sequence III. Redbeds; conglomerate, sandstone and siltstone. Basal conglomerates "mature" in central and western P.E.I., "immature" in southeastern P.E.I. Plant fossils not observed.
STEPANIAN/ UPPER PENNYSLVANIAN
II Megacyclic Sequence II. Redbeds; conglomerate, sandstone, siltstone. Basal conglomerates "submature". Plant and fern imprints locally present.
I Megacyclic Sequence I. Red and grey beds; sandstone and siltstone, minor conglomerate. Transition sequence - coal measures to redbeds, Fossil plants and fern imprints locally very common.
SYMBOLS
Approximate geological contact
Fault
Anticline
Syncline
Bell Isle Bay Fault
Petitcodiac Fault
Gallas Pt. Anticline
Kilmuir Syncline
5
I
II
III
IV
0
10
20
KILOMETRES

Geology by H.W. van de Poll, 1977, 1980 modified in part after Prest Y.K., 1962, 1972 and Frankel, L., 1966.

Figure 4. Geological map of Prince Edward Island

The lithology of Prince Edward Island is made up of the following five major sedimentary and one igneous rock type:

(1) Pale to dark red silt and claystone.
(2) Gray fine grained limestone.
(3) Very fine to very coarse grained red sandstone, minor gray or greenish gray sandstone.
(4) Grayish red intraformational mud-pellet conglomerate and chaotic breccia.
(5) Grayish red quartz-pebble and cobble conglomerate.
(6) Tholeiitic diabase.

Silt and claystone units vary in thickness up to 3 m and account for approximately 30% of older exposed units. They are responsible for the clayey-type till in both the western and south central parts of the province, because the type of till corresponds with the underlying bedrock to a large extent. They are slightly calcareous. The red shale occurrences on the island are often referred to locally as brick clay; tests on shale from Bacon Point indicate the strata have ceramic properties for certain brick and tile products (26).

Most recorded limestone occurrences are relatively impure calcic or marly intraformational mud-pellet conglomerates rather than pure limestone. The best known occurrence is a thin bed around the north side of Little Miminigash Pond.

Sandstone, ranging in grain size from very fine to very coarse, is the dominant lithology of the island and underlies an estimated 60% of the surface area. Individual sandstone beds vary in thickness but seldom exceed 3 m and are usually discontinuous. The coarsest sandstone fractions are widely interbedded with intraformational mud-pellet conglomerate, mudstone breccia, or quartz-pebble conglomerate, whereas the finer grained sandstone beds occur in association with silt and claystone. The sandstone is arkosic in composition and commonly contains mica along lamination planes. With the aid of a microscope, the sandstone can be seen to consist of about 70% clastic particles and 30% matrix. The clastic fraction is made up of 45-60% quartz, 20-30% feldspar, 10-20% lithic fragments, 5-10% mica, and 5% specular hematite. The matrix is primarily hematitic clay-silt with considerable carbonate content.

Mud-pellet conglomerates and chaotic breccias are separate occurrences of intraformational clastic rocks of differing origins. The mud-pellet conglomerates are carbonate cemented and occur as continuous horizons in association with coarse sandstone or quartz-pebble conglomerates. In contrast, chaotic breccias are not usually cemented and occur as discontinuous lenses in finer sandstone. Combined, they make up 10% of all strata on the island. The composition of the mud-pellet conglomerate is approximately 70% clastic parti[illegible] and 30% carbonate content. The clastic particles range in size from coarse sand to small pebbles and include the following composition: 35-40% quartz, 5-15% feldspar, 20-30% granules and pebbles, and 20-30% intraformational mud-pellets.

Pebble and cobble conglomerates make up an estimated 5% of the total surface rocks on the island. They occur as discontinuous lenses and horizons within well-cemented mud-pellet conglomerate or coarse to very coarse sandstone at the base of megacyclic units. Individual clasts range from 2 to 15 cm in diameter. Dense fine grained quartzite and rhyolite in addition to quartz are the dominant lithologies, whereas minor chert, and a few igneous and metamorphic pebbles make up the minor constituents. Carbonate content is abundant. The strata represent the present and potential source of gravel on the island. The more easily available deposits are mined where weathering has dissolved the cementing agent.

The only known surface occurrence of igneous rock is a tholeiitic diabase sill, or dyke, exposed on the northeastern extremity of George Island in Malpeque Bay.

The bedrock strata are covered by a relatively thin mantle of drift. These deposits consist mainly of ground moraine or basal till but include residual, thin ablation till as well as glaciofluvial and minor marine deposits. Basal till is of local origin and covers about three-quarters or more of the province. Its average depth is probably less than 1.5 m. The material is reddish brown, strongly acid, usually compact and dense. It is dominantly fine sandy loam but varies from loamy sand to loam and clay loam in a few areas. The loam tills commonly overlie or are derived from local mudstone-siltstone and are more common in the western part of the province. Here also, minor additions of "foreign" or "outside-the-province" material occur in surface deposits. The basal tills have been separated into three textural phases as follows:

(1) Sand phase till - less than 35% silt plus clay; less than 8 to 10% clay.
(2) Clay-sand phase till - 35 to 50% silt plus clay; 8 to 18% clay.
(3) Clay phase till - more than 50% silt plus clay.

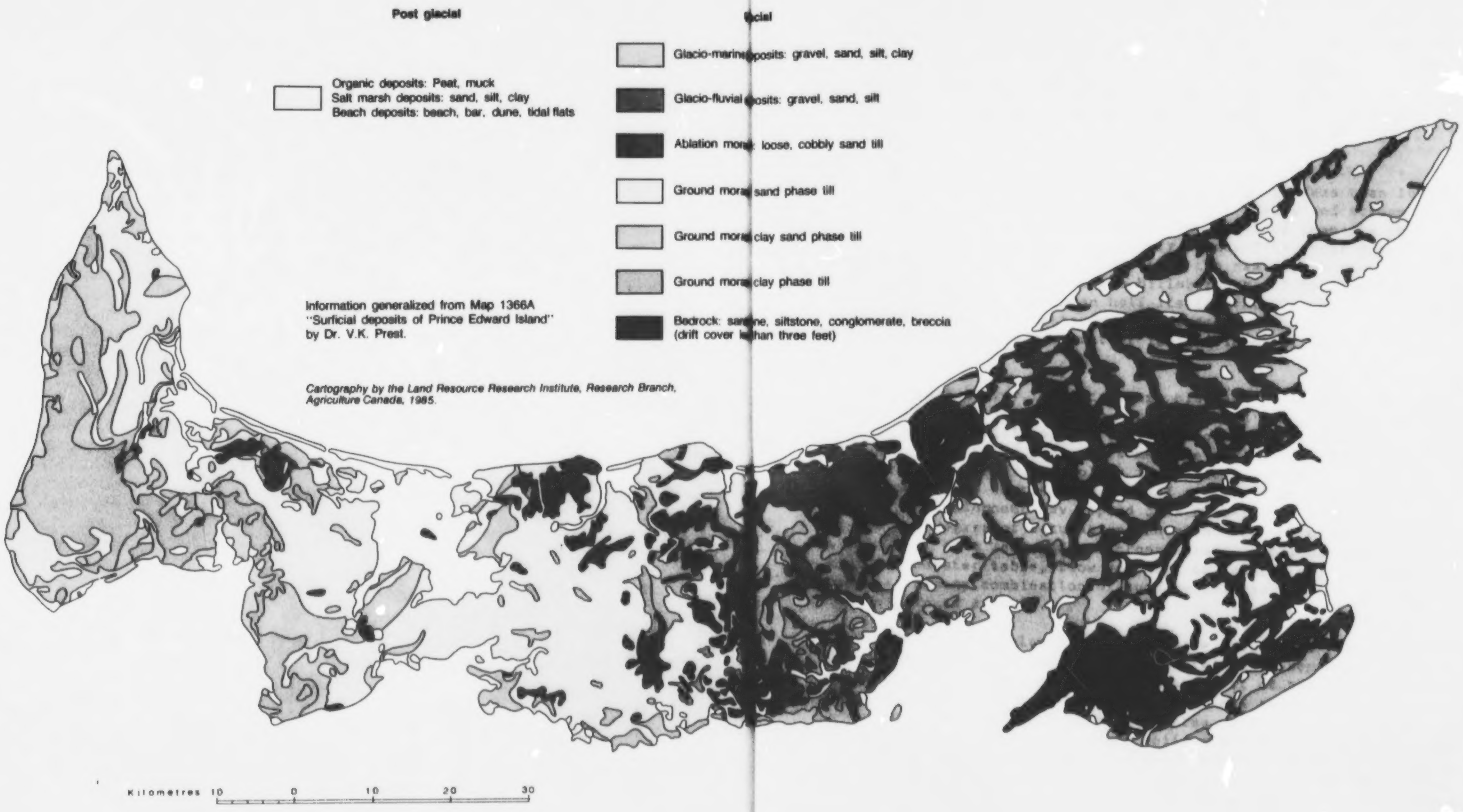
These separations correspond to those made by Prest in his map of surficial deposits (Fig. 5), and were used for the soil survey to differentiate parent material units.

Glaciofluvial deposits include eskers and kames that are generally coarse textured and cobbly as well as other ice-contact deposits that vary from slightly modified till to well-washed and sorted gravel. The ice-contact stratified drift covers about one quarter of the eastern part of the island. It occurs as a valley-type interconnecting complex, suggestive that deglaciation occurred by the down-melting of a rapidly thinning stagnant ice mass. Small sandy glacial pond deposits also occur but are not common.

Marine deposits occur in the western part of the province adjacent to the coast and below the 22 m contour. The deposits consist of well to poorly stratified or wave-washed sands and gravels with sandstone and calcareous breccia fragments. Marine clays and silts are less common and usually thinly bedded. Associated with the deposits are modified loose tills.

All till deposits are relatively thin. In many areas bedrock is encountered within 1 m of the surface. This occurs more frequently in hilly or exposed areas, and soil profiles are formed in part in residual materials. Many of these areas are outlined on the surficial deposits map. During field work the distinction was difficult from place to place and not all areas that have bedrock or regolith within 1 m of the soil surface are identified.

Recent deposits are of small total extent. They consist of sediments eroded from the land surface and redeposited in stream floodplains, in


Post glacial
acial
Organic deposits: Peat, muck
Salt marsh deposits: sand, silt, clay
Beach deposits: beach, bar, dune, tidal flats
Glacio-marin posits: gravel, sand, silt, clay
Glacio-fluvial osits: gravel, sand, silt
Ablation mor : loose, cobbly sand till
Ground mora sand phase till
Ground mora clay sand phase till
Ground mora clay phase till
Bedrock: sa ne, siltstone, conglomerate, breccia
(drift cover l han three feet)
Kilometres 10 0 10 20 30

Information generalized from Map 1366A "Surficial deposits of Prince Edward Island" by Dr. V.K. Prest.

Cartography by the Land Resource Research Institute, Research Branch, Agriculture Canada, 1985.

Figure 5. Surficial deposits of Prince Edward Island

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estuaries, or as tidal deposits of sand, silt, clay, and decaying organic debris. Other deposits include dune sands, sand beaches, beach ridges, barrier islands, and baymouth spits and bars. These are more prevalent on the north coast because of the copious supply of sand in the region and the less protected nature of the shoreline.

Small, thin deposits of peat in the form of sphagnum bogs, fens, and swamps are scattered throughout the island.

Drainage

Since the most inland point of the island is less than 16 km from the sea, the drainage system consists of many short rivers and streams. The dominantly dendritic pattern has many channels and parts of channels that antedate the last glaciation. Streams frequently "under-fit" their present channel and many have drowned valleys where they enter the sea due to postglacial sea level rise. The largest river is the Hillsborough, 35 km long, with a tidal estuary extending upstream more than half its length. Others include the Dunk, Yorke, Elliot, Trout, Mill, Montague, and Brudenell rivers, many of which have appreciable estuaries but rather insignificant alluvial stream channel deposits.

In a soil survey, soil drainage classes are based on soil profile saturation, that is its depth, duration, and time of occurrence. Saturation as such is judged mainly on the basis of color differences that indicate mottling or gleying has taken place at some time during the development of the soil profile. Such color morphology is caused by biological activity that depletes oxygen and leads to the formation of mottles under anaerobic conditions. The degree of development may depend on a number of conditions such as temperature, length and degree of saturation, nutrient status, or other conditions that affect soil as a medium for microorganisms. Soil saturation may result from a high groundwater table, slow vertical or lateral soil permeability, lateral seepage, or any combination of such hydrologic factors acting in concert with the climate as a whole.

Prince Edward Island soils that have deep water tables and adequate to rapid permeabilities tend to be well drained to somewhat excessively so. Such soils are more prevalent in the eastern part of the province where they occur on glaciofluvial or coarse textured till and residual parent materials. They are also common in the Central Hill area on steeply sloping glacial till and residual parent materials. Many soils are known to have slow subsoil permeabilities below about 40 cm yet exhibit no mottling in the profile. These soils seldom remain saturated for long periods during the growing season. Excess water moves laterally down the slope through the more permeable upper solum. Such soils are classed as well drained to moderately well drained and include the major percentage of island soils. Soil saturation is prolonged beyond a few days and this effectively shortens the growing season. Soils classed as imperfectly and poorly drained exhibit slight to strong mottling in some parts of the profile. Soil saturation in these soils is caused by either high perched or permanent water tables. Lateral drainage is usually prevented by slope position or slow solum permeability.

Vegetation

Prince Edward Island lies wholly within the Acadian forest region. Today, forest vegetation of various quality covers about half the island. Records indicate original stands were of excellent quality and dominantly deciduous on suitable soils. Stands consisted of red oak, sugar maple, yellow birch, and beech, with elements of spruce and balsam fir intermixed on protected sites or lower slopes, and a prominence of pine and hemlock probably on the sandier or glaciofluvial soils.

There are few areas left that have not been severely disturbed by humans. Logging, fire, disease, and high-grading have adversely affected stand quality and productivity. Hemlock and pine have virtually disappeared and many undesirable or weed species have replaced former productive species. Spruce, balsam fir, and white birch now make up more than two-thirds of the estimated volume of merchantable timber on the island, and beech and maple account for about 15% of the total.

The relationship between soil properties and forest vegetation is obscured by many factors but moisture regime appears to exert the strongest influence on both site productivity and species composition. Black spruce, tamarack, alder, and cedar are more prevalent as drainage becomes poorer, but competition may play a role. Field observations suggest that natural Eastern White Cedar regeneration is associated with soil pH or calcium content. Tamarack appears to establish easily regardless of drainage along with balsam fir, white spruce, white birch, and poplar. Productivity increases with improved drainage but availability of adequate moisture during part of the growing season may be a serious limiting factor. The slight differences in fertility between island soil types do not appear to have much effect on either productivity or species composition. Soil texture and structure affect sites indirectly, mainly through their effect on drainage, moisture regime, and soil depth.

METHODS OF SURVEY

Detailed maps and map units

Mapping the soils was conducted in a moderately detailed manner across the province. Soil boundaries were determined by examining the soil profile at frequent intervals. Examinations were made in vertical exposures by soil core, using either shovel or hand auger and occasionally mechanical equipment. Normal depth of examination was approximately 100 cm, which was the basis for the differentiation of units. Soil lines were plotted on photographs and subsequently on photomosaics. The maps were digitized to permit computer plotting of derivative or interpretive maps on request. The latter type of map serves to depict the suitability of different soils for specified uses or to focus on selected characteristics of the soil.

There are 355 detailed soil maps and 100 derived maps covering Prince Edward Island. They are printed at a scale of 1:10 000, mainly because this base was available for use. The choice of publication scale is not, in this instance, to be taken as an indication of the level of precision or the number of observations per unit area that went into the survey. The intensity level requested was for a survey at a scale of 1:20 000. This is the approximate level of input on cleared land but is somewhat less in areas more difficult to traverse and map.

The detailed maps are retained on open file in the soil survey office and are available upon request. Single sheets of either the soil map or the derived or interpretive print-out maps should identify the minimum size block, or area, of interest, using the index map provided at the back of this report. The detailed soil maps are available from the Soil Survey Office, Research Station, Research Branch, Agriculture Canada, P.O. Box 1210, Charlottetown, P.E.I. C1A 7M8, or from the Provincial Department of Agriculture, Plant Industry Services, P.O. Box 1600, Research Station, Charlottetown, P.E.I. C1A 7N3. They are provided to users as black and white ozalid copies. The soil maps have a photomosaic background for identification of location. The quality of some maps is only fair and occasionally some enhancement to improve line contrast may be necessary. Requests for derived or interpretive maps may be made in the same manner but these will be computer-plotted in Ottawa on a cost-recovery basis.

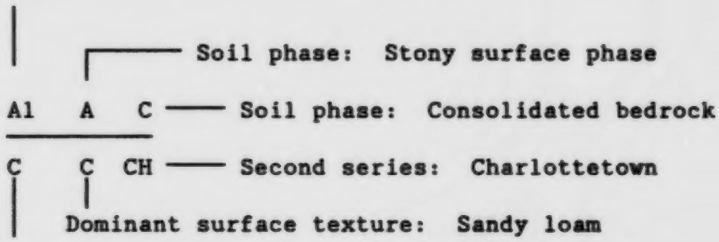
The soils of Prince Edward Island are placed in 44 kinds of soil and eight nonsoil map units. The soil map shows their distribution and the report explains the kind of soil identified. The map units generally take the name of the dominant soil series. Exceptions are organic soils, named for associations on defined landforms, and miscellaneous land types. In order to characterize the mineral soil map units the level of taxonomy used is the soil series and phase. The soil series is defined as a naturally occurring soil body within which any soil profile has a similar number and arrangement of horizons whose color, texture, structure, consistence, thickness, reaction, and composition are within a narrowly defined range. Mineral soil map units are further delineated into soil phases on the basis of texture of the surface horizon, variations in relief, bedrock depth, or other features of some significance to soil use and management.

Simple or pure map units are estimated to be about 80% pure. That means that the soil named and described at the soil series taxonomic level makes up 65% or more of the map unit and that most inclusions are similar or closely related soils. A second soil is named in delineations when it makes up 10-15% of the area and usually not more than 35-40%. A paralithic bedrock contact is common to many soils and is treated as a soil phase within map units.

Map symbol coding on the detailed maps

Each delineation on the soil map is identified by letter symbol: two letters for the soil name and one letter for each phase described. Map units are listed in alphabetical order for ease of reference, except for the miscellaneous land types grouped at the end.

Example:
Soil series: Alberry


Soil phase: Stony surface phase
Al A C
Soil phase: Consolidated bedrock
C C CH
Second series: Charlottetown
Dominant surface texture: Sandy loam

Slope phase: 2 to 5%

The first two letters in the numerator of the map symbol refer to the soil series.

The third or fourth letter in the numerator refers to soil phase as follows:

A- Stony surface phase
B- Moderately well drained phase (Class 3 drainage)
C- Consolidated bedrock phase (50 to 100 cm depth)
D- *Unconsolidated bedrock phase (50 to 100 cm depth)
E- Cobbly or stony subsoil phase
F- Peaty surface phase

*Denoted in lowercase in text, tables, and map legend.
G- Ortstein phase
I- Coarse or moderately coarse texture (20 to 50 cm depth)
J- Medium to moderately fine texture (20 to 50 cm depth)
K- Complex, undifferentiated

The first letter in the denominator refers to the slope phase as follows:

B- 0-2% slope
C- 2-5% slope
D- 5-9% slope
E- 9-15% slope

F- 15-30% slope
G- more than 30% slope
I- 5-15% slope (DE complex)
J- 9-30% slope (EF complex)

The second letter in the denominator refers to the dominant surface texture as follows:

A- Sand or coarser
B- Loamy sand or gravelly loamy sand
C- Sandy loam (<8% clay)
D- Fine sandy loam or very fine sandy loam
E- Loam or silt loam
F- Sandy clay loam or clay loam

If a second soil is shown for any delineation it is placed as the last two letters in the denominator of the symbol.

Map unit symbol	Soil name	Map unit symbol	Soil name
Ab	Abney Road	Hz	Hazelbrook
Al	Alberry	He	Hebron
Ar	Arlington	Ki	Kildare
Bp	Baptist Point	Ve	Lake Verde
Br	Brackley	Lr	Locke Road
Bu	Bunbury	Ma	Malpeque
Ca	Canavoy	Mg	Margate
Cp	Carey Point	Mp	Mossy Point
Ch	Charlottetown	Mr	Munn Road
Cr	Crapaud	Ne	Newton
Cu	Culloden	Ol	O'Leary
Db	Dunblane	Or	Orwell
Df	Dunstaffnage	Pi	Pisquid
Du	Duvar	Po	Pownal
Eg	Egmont	Rp	Rocky Point
Em	Emyvale	Sp	Salt Grass Point
En	Enmore	Ti	Tignish
Fp	Fifteen Point	Ui	Uigg
Fr	Frenchfort	Wp	West Point
Go	Gowanbrae	Wn	Winsloe
Ha	Haliburton	Wf	Wolfe Inlet
Hab	Haliburton Brook	Wi	Wood Island

Miscellaneous land type

Map unit symbol	Soil name		Special features on 1:10 000 scale soil map set
Cb	Coastal Beach	╨╨╨╨╨	Scarps or steep land
Ds	Dune sand		
Sm	Salt Marsh	⩡	Wet spots
Sc	Stream Complex		
Pg	Gravel Pit	∿	Erosion gully
Pb	Borrow Pit or other		
Ai	Airport	⌒	Stream
Ce	Cemetery Land		
St	Steep Land	—	Ditch (open)

In Table 6 a soil key is presented. The soils are placed in groups based on similar parent materials. Within each of the five categories of mineral materials one can key out related soils differing in degrees of wetness (drainage). Within the sixth category, organic materials, differentiation is based on plant nutritional level of organic material and associated waters.

Table 6. Key to the soils of Prince Edward Island and their extent

Soil materials, drainage (classification)	Map symbol	Hectares
1. Soils developed on moderately fine textured acid glacial till or residual materials		
(a) Moderately well drained		
Fifteen Point (Brunisolic Gray Luvisol)	Fp	802
(b) Imperfectly drained		
Wolfe Inlet (Gleyed Gray Luvisol)	Wf	592
(c) Poorly drained		
Egmont (Orthic Luvic Gleysol)	Eg	965
2. Soils developed on medium textured acid glacial till or residual materials		
(a) Well drained		
Tignish (Podzolic Gray Luvisol)	Ti	13 698
(b) Moderately well drained		
O'Leary (Brunisolic Gray Luvisol)	Ol	11 300
(c) Imperfectly drained		
Duvar (Gleyed Gray Luvisol)	Du	8 273
(d) Poorly drained		
Margate (Orthic Luvic Gleysol)	Mg	24 590

Table 6. Key to the soils of Prince Edward Island and their extent (continued)

3. Soils developed on moderately coarse to medium textured acid glacial till or residual materials		
(a) Well drained		
Charlottetown (Orthic Humo-Ferric Podzol)	Ch	166 381
Charlottetown (paralithic bedrock phase)	Chd	21 880
Alberry (Orthic Humo-Ferric Podzol)	Al	85 337
Alberry (paralithic bedrock phase)	Ald	13 974
Emyvale (Orthic Dystric Brunisol, shallow lithic phase	Em	298
(b) Imperfectly drained		
Malpeque (Gleyed Eluviated Dystric Brunisol)	Ma	17 770
Crapaud (Gleyed Eluviated Eutric Brunisol)	Cr	4 051
(c) Poorly drained		
Winsloe (Orthic Gleysol)	Wn	11 379
4. Soils developed on variable textured acid to weakly alkaline marine deposits or noncompact glacial till		
(a) Well drained		
Kildare (Orthic Humo-Ferric Podzol)	Ki	6 807
Haliburton (Orthic Humo-Ferric Podzol)	Ha	7 187
(b) Moderately well drained		
Haliburton Brook (Eluviated Eutric Brunisol)	Hab	1 812
Dunblane (Eluviated Eutric Brunisol)	Db	1 703
(c) Imperfectly drained		
Carey Point (Gleyed Eluviated Dystric Brunisol)	Cp	1 475
Salt Grass Point (Gleyed Eluviated Eutric Brunisol	Sp	8 699
West Point (Gleyed Eluviated Eutric Brunisol)	Wp	4 525
Munn Road (Gleyed Eluviated Eutric Brunisol)	Mr	569
(d) Poorly drained		
Rocky Point (Orthic Gleysol)	Rp	8 987
Mossy Point (Orthic Gleysol)	Mp	14 519
Baptist Point (Orthic Gleysol)	Bp	11 625
Locke Road (Orthic Gleysol)	Lr	49
5. Soils developed on strongly acid coarse to medium textured glaciofluvial or ablation-residual materials		
(a) Well or rapidly drained		
Dunstaffnage (Orthic Humo-Ferric Podzol)	Df	2 714
Culloden (Orthic Humo-Ferric Podzol)	Cu	51 595
Culloden (paralithic bedrock phase)	Cud	6 220
Bunbury (Ortstein Humo-Ferric Podzol)	Bu	201
Newton (Orthic Humo-Ferric Podzol)	Ne	176
Gowanbrae (Orthic Humo-Ferric Podzol)	Go	3 415
(b) Imperfectly drained		
Uigg (Gleyed Eluviated Dystric Brunisol)	Ui	6 879
Brackley (Gleyed Eluviated Dystric Brunisol)	Br	1 176
Hebron (Gleyed Eluviated Dystric Brunisol)	He	97
(c) Poorly drained		
Wood Island (Ortstein Humic Podzol)	Wi	2 081
Orwell (Orthic Gleysol)	Or	7 794

Table 6. Key to the soils of Prince Edward Island and their extent (concluded)

6. Soils formed on poorly drained organic materials (associations on landform units)		
(a) Low nutrient content, strongly acid organic terrain formed from (1) dominantly undecomposed sphagnum moss peat on raised bog landform; (2) moderately decomposed sphagnum moss peat on flat bog landform; (3) moderately decomposed sphagnum and woody peat on bowl bog landform		
(1) Arlington association	Ar	972
(2) Pownal association	Po	2 959
(3) Pisquid association	Pi	420
(b) Low to moderate nutrient content, acid organic terrain formed from		
(1) moderately decomposed sedge peat on salt marsh landform; (2) moderately decomposed woody and sphagnum peat on horizontal fen landform		
(1) Frenchfort association	Fr	378
(2) Lake Verde association	Ve	669
(c) Moderate to high nutrient content, mainly acid organic terrain formed from (1) strongly decomposed woody and sedge peat material in stream swamp landform; (2) moderately to strongly decomposed material on basin swamp landform		
(1) Abney Road association	Ab	576
Hazelbrook association	Hz	150
(2) Canavoy association	Ca	117
Enmore association	En	96
7. Miscellaneous land types		
(1) Airport	Ai	711
(2) Cemetery	Ce	68
(3) Dune Sand	Ds	2 338
(4) Pits (borrow; gravel)	Pb; Pg	1 707
(5) Coastal Beach	Cb	9 466
(6) Stream Complex	Sc	12 971
(7) Steep	St	145
(8) Salt Marsh	Sm	8 187
Total land area		573 525 ha

Generalized maps

The generalized soil map set is presented with this report. It has been printed at a scale of 1:75 000 and prepared by generalizing information contained in the detailed map set. Similar soils were grouped on the basis of mode of origin and parent material texture, soil development and drainage, and soil slope. The decile percentage of soils in each delineation has been summarized from the detailed maps and indicates the purity or actual percentage of soils that could be shown for each delineation.

The legend provided with the generalized soil map set can also be used with the detailed map set. However, map units on the detailed map set include many irregular soil phases based on differences in the texture of surface horizons, variations in relief, bedrock depth, and other features significant to some extent on land use. The only phases retained on the generalized maps are slope phases and bedrock phases for some major soils. The soil map sets (one at a scale of 1:10 000 and the other at a scale of 1:75 000 show soil distribution detail, and the report explains the kind of soil identified. Thus for practical purposes units shown for mineral soils can be considered as near equivalents of soil series, whereas units shown for organic soils are associations of undifferentiated soil series on defined landforms. Miscellaneous land types are more or less descriptive units, identified only by photo interpretation or by location in the field but unsurveyed in terms of profile observation and description.

The soil profile

The soil profile has layers, or horizons, formed roughly parallel to one another and to the earth's surface. They extend in succession downward to unaltered parent material. The horizons differ from one another in biological, physical, and chemical composition. They are formed through losses, additions, transformations, and translocations that result from the interaction of soil-forming factors. The soil-forming factors are climate, biological activity (vegetation), relief and drainage, parent material, and time. Study of the horizons and profiles enables classification based on the kind and degree of development that has taken place. Master horizons are designated L, F, H, or O for organic horizons and A, B, or C for mineral horizons. The upper part of the mineral soil profile from which substances have been leached or removed is called the A horizon, the middle part is an area of accumulation or alteration called the B horizon, and the underlying material relatively unaffected by soil-forming factors is called the C horizon. The kind of master horizon is indicated by lowercase letter suffixes. Master and lowercase letters are defined in Table 7. A diagramatic example of the use of these is given in Fig. 6.

Table 7. Definition of soil horizons pertinent to Prince Edward Island

Organic horizons

Organic horizons are found in organic soils and commonly at the surface of mineral soils. They may occur at any depth beneath the surface in buried soils. They contain more than 17% organic carbon by weight. Two groups are recognized, the O horizons and the L, F, and H horizons.

O- This is an organic horizon developed mainly from mosses, rushes and woody materials. It is divided into the following subhorizons.

Of- This is an O horizon consisting largely of fibric materials that are readily identifiable as to botanical origin.

Om- This is an O horizon consisting of mesic material, a stage of decomposition intermediate between fibric and humic materials. The material is partly altered both physically and chemically and does not meet the requirements of either a fibric or humic horizon.

Oh- This is an O horizon consisting of humic material that is at an advanced stage of decomposition.

L, F, and H- These are organic horizons that have developed primarily from the accumulation of leaves, twigs, and woody materials with or without a minor component of mosses. Usually they are not saturated with water for prolonged periods.

L- This is an organic horizon characterized by materials in which the original structures are easily discernible.

F- This is an organic horizon characterized by partly decomposed organic matter. Some of the original structures are difficult to recognize.

H- This is an organic horizon characterized by decomposed organic matter in which the original structures are indiscernible.

Mineral horizons and layers

Mineral horizons contain 17%, or less, of organic carbon by weight.

A- This is a mineral horizon formed at or near the surface in the zone of leaching or eluviation of materials in solution or suspensions, or of maximum in situ accumulation of organic matter or both. The accumulation of organic matter is usually expressed morphologically by a darkening of the surface soil (Ah), and conversely the removal of organic matter and other materials is usually expressed by a lightening of the soil color (Ae) relative to the lower part of the subsoil.

B- This is a mineral horizon characterized by enrichment of organic matter, sesquioxides, or clay; or by the development of soil structure; or by change of color denoting hydrolysis, reduction, or oxidation. The accumulation in B horizons of organic matter (Bh) is evidenced by dark colors. Clay accumulation is indicated by finer soil textures and by clay cutans or peds or lining pores (Bt). Changes in soil structure and color are due to oxidation of iron (Bm) or to mottling and gleying of altered material associated with periodic reduction (Bg).

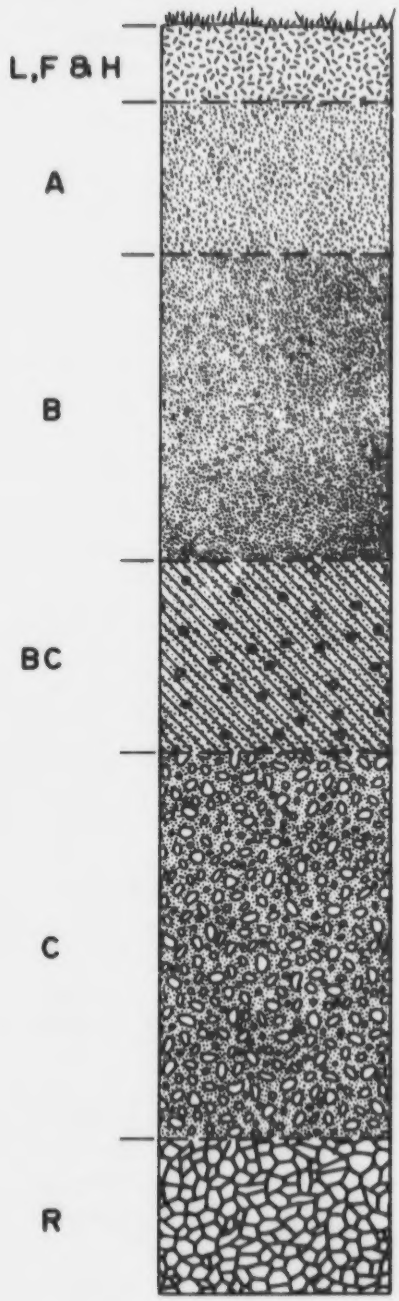
C- This is a mineral horizon comparatively unaffected by pedogenic processes operative in A and B, except the process of gleying (Cg). Rock no harder than 3 on Mohs' scale is considered to be C horizon.

R- This is a consolidated bedrock layer that is too hard to break in the hands (H3 on Mohs' scale) or dig with a spade when moist and does not meet the requirements of a C horizon. The boundary between the R layer and overlying unconsolidated material is called a lithic contact.

Table 7. Definition of soil horizons pertinent to Prince Edward Island (concluded)

Lowercase suffixes

b- Denotes buried soil horizon.
c- A cemented (irreversible) pedogenic horizon. Ortstein, placic, and duric horizons of Podzolic soils are examples.
cc- Cemented (irreversible) pedogenic concretions.
e- A horizon characterized by eluviation of clay, Fe, Al, or organic matter alone or in combination. It is used with A (Ae).
f- A horizon enriched with amorphous material, principally Al and Fe combined with organic matter. It usually has a chroma of 3, or more. It contains at least 0.6% pyrophosphate-extractable Al+ Fe in textures finer than sand. In this report extractable Fe+ Al was determined by oxalate and these values must exceed the C horizon by 0.8%, or more.
g- A horizon characterized by gray colors or by prominent mottling, or both, is indicative of permanent or periodic intense reduction. Chromas of the matrix are generally one, or less.
h- A horizon enriched with organic matter. It is used with A alone (Ah), or with A and e (Ahe), or with B alone (Bh), or with B and f (Bhf).
j- This is used as a modifier of suffixes e, f, g, and t to denote an expression of but failure to meet the specified limits of the suffix it modifies. It must be placed to the right and adjacent to the suffix it modifies. For example, Bfjgj means a B horizon with weak expression of both f and g features.
k- Denotes the presence of carbonate, as indicated by visible effervescence when dilute HCl is added.
m- A horizon slightly altered by hydrolysis, oxidation, or solution or all three to give a change in color or structure, or both.
p- A horizon disturbed by man's activities such as cultivation, logging, and habitation.
t- An illuvial horizon enriched with silicate clay. It is used with B alone (Bt) or B and g (Btg), and with others.
x- A horizon of fragipan character. A fragipan is a loamy subsurface horizon of high bulk density and very low organic matter content. When dry it has a hard consistence, when moist it has moderate to weak brittleness. It frequently has bleached fracture planes and is overlain by a friable B.



L, F, and H: organic horizons. The organic matter is raw in L, partly decomposed in F, and decomposed in H.

A: mineral surface horizon. It is dark colored because of the accumulation of humus (Ah) or light colored when clay, iron, and humus have been leached out (Ae).

B: mineral subsurface horizon, usually of accumulation. It may be enriched by iron (Bf), by iron and organic matter (BhF), or it is altered, to give a change in color or structure (Bm). If the Bf or Bhf horizon is cemented by iron and organic matter (Bfc, Bhfc) the horizon is called an ortstein horizon.

BC: transitional horizon.

C: mineral horizon of unweathered soil or parent material. This horizon is relatively unaffected by soil-forming processes, except for gleying (Cg) or cementation (Cc).

R: substratum of unconsolidated bedrock, which may be close to the surface or many metres below it.

The suffix "g" is used with all horizons if mottling occurs because of poor drainage. The symbol "j" is used after a suffix to denote a failure to meet the specified limits of the suffix.

Figure 6. Common horizons in a hypothetical soil profile.

Soil formation and classification

Soil forms as a relatively thin (up to 2 m) veneer at the earth's surface. It is a natural body capable of supporting plants and, indirectly, other life. Soil profiles and variations between them display consistent and distinctive morphological characteristics produced by the interaction of local and regional environmental factors. These factors in Prince Edward Island have been discussed in general terms earlier in this publication. Some of the ways they effect soils are discussed briefly here.

Climate exerts both local and regional influence and generally determines the dominant direction of soil development. It controls the kind of vegetation and its effects upon microenvironments, energy levels, and the cycling of nutrients. Dead vegetation added to the soil serves as an energy source for soil organisms. Temperature and rainfall determine the rate of weathering. The excess of rainfall over evaporation determines leaching or the rate of removal of weathered products. The leaching ability is also governed by the kind of litter deposited by the vegetation; it is highest under ericaceous shrub and coniferous or moss litter, somewhat less under litter from hardwoods, and least under grasses. In the survey area the interaction of climate and vegetation ensures acidic-infiltrating water, and the leaching of bases, including plant nutrients, and is the basic reason for the acidity and infertility of soils in the region.

Relief, or slope, exerts its influence by affecting surface runoff, soil erosion, water infiltration, and groundwater flow. Soil parent material determines the texture of the soil and the mineral content. It also governs to some extent internal soil drainage, fertility, and soil color. Soil formation and differentiation takes time. Parent rock from which parent materials in the survey area developed have been subjected to very long preglacial and interglacial weathering. The soil horizons and profiles, however, have developed over the relatively short span of 10 000 years since the last ice age. Rather intense leaching since has produced soils that mostly have reached equilibrium with the environment and may be called mature.

The system of soil classification used in Canada (7) consists of 9 orders, 28 great groups, about 80 subgroups, a large number of soil families, and more than 4000 soil series.

All soils within a great soil group have a distinctive kind of profile, a unique arrangement of horizons, produced over broad areas by a particular kind of soil-forming environment. Within the great group there are regional variations in the nature and intensity of a particular horizon that permit the separation of subgroups. Orthic subgroups represent the central concept or the modal soil of the great group; other subgroups represent significant modifications of basic chemical processes prevailing in the soils. Many of them are far from the central concept and intergrade to other great groups.

A soil family is a division of a soil group that has similar mineralogy, texture, reaction, soil climate, and problems associated with soil shallowness.

The soil series, the basic component of map units on the soil map, are divisions of soil families. All member profiles of a soil series have developed from the same parent material and possess similar profile characteristics such as texture, color, reaction, structure, and composition within a narrowly defined range. They must have similar moisture regimes.

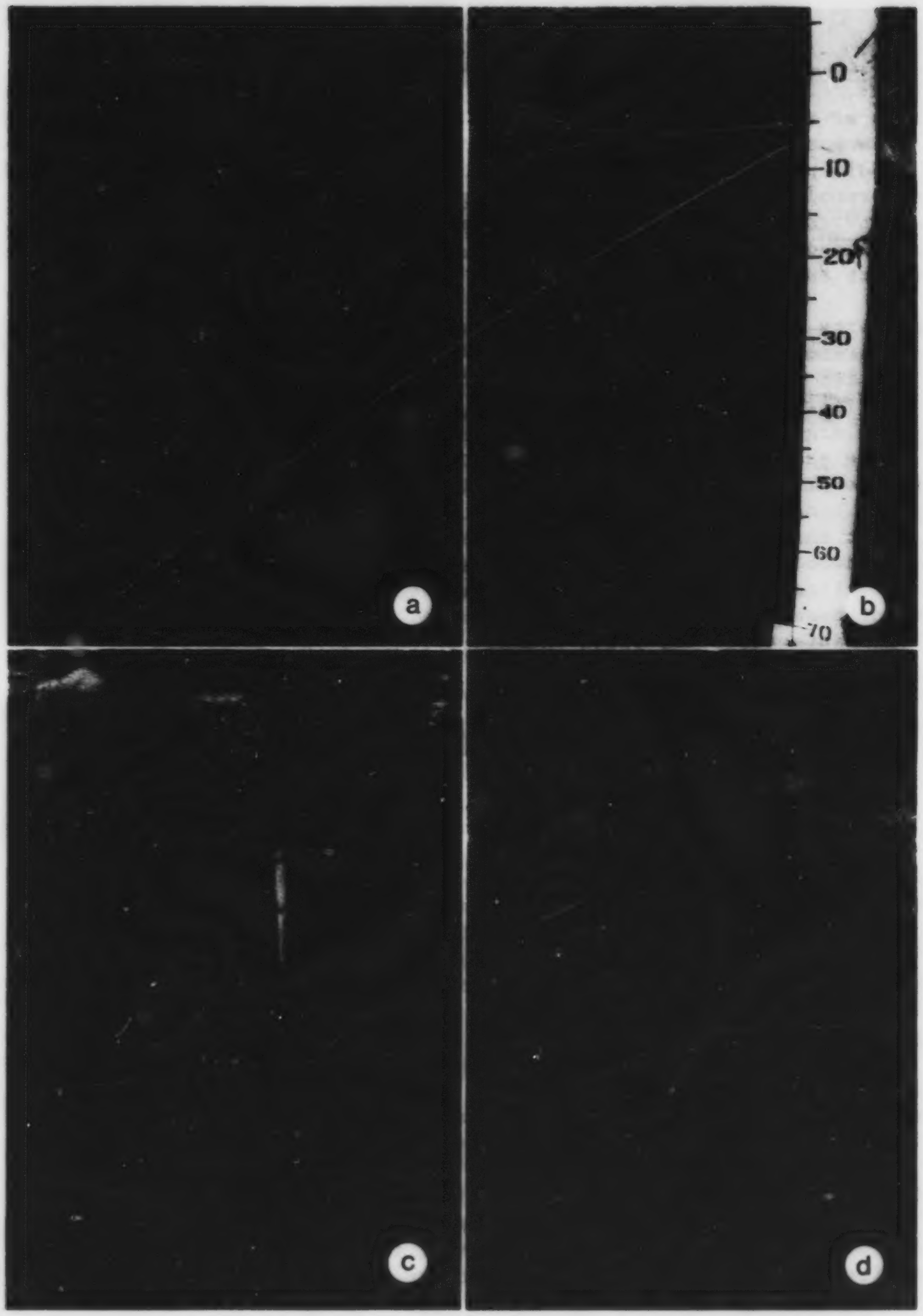


Figure 7. Plate showing four soil profiles.
a) Typical Humo-Ferric Podzol, Alberry series;
b) Ortstein Humic Podzol, Wood Island series;
c) Podzolic Gray Luvisol, Tignish series;
d) Gleyed Gray Luvisol, Duvar series.

Figure 8. Alberry soils on undulating landscape.

Figure 9. Charlottetown soils on gently undulating landscape.

Figure 10. Culloden soils on undulating landscape.

Figure 11. Typical landscape on Tignish-O'Leary soils.

Figure 12. Sand dunes, Brackley, P.E.I.

Figure 13. Erosion frequently occurs during spring runoff.

The formation and classification of Prince Edward Island soils

The 35 mineral soil series shown on the soil map fall into 11 subgroups and 7 great groups. They are arranged in Table 8 to show their general relationship to one another. Subgroup names appear in italics. The soil series in each horizontal row have evolved from the same kind of parent material but differ in drainage status (moisture regime). In any vertical column, that is, drainage class, soils with parent material of similar texture within any subgroup have similar physical features and usually similar management requirements. They are soil families and are indicated in the legend of the generalized soil map set.

In the province, as in the Maritime region in general, most of the well-drained soils are members of the Podzol great groups. The profile of a typical Humo-Ferric Podzol is shown in Fig. 7a under the Culloden series. In this profile, Fe, Al, and organic matter have accumulated in the B horizon. Another kind of podzol is the Humic Podzol great group. An example, (Fig. 7b) Wood Island series is the only soil belonging to this great group. The soil typically has a black or dark brown Bh horizon with low iron content and dominantly fulvic acid organic materials. Other well-drained soils in the survey area include Luvisol and Brunisol great groups. They resemble podzols in having light-colored Ae horizons but differ in the kind of B horizon that develops. Luvisol soils have B horizon (Bt) in which translocated clay is the main accumulation product. The amount of translocated clay in island soils is low but is evident with the aid of a microscope, using thin section slides (5). An example of the former is Tignish series (Fig. 7c), a Podzolic Gray Luvisol subgroup. It has a podzol Bf horizon overlying the Bt horizon of clay accumulation. Brunisol soils have B horizon (Bm) with insufficient Fe, Al, organic matter, or translocated clay to qualify as Podzolic or Luvisolic. An example of the Brunisol great group is described under the Dunblane series, an Eluviated Eutric Brunisol subgroup that has a light-colored Ae horizon and a base-saturated B horizon with insufficient Fe, Al, organic matter, or clay accumulation to qualify as Podzol or Luvisol.

When natural drainage is restricted by topography or slowly permeable subsoil layers, soil wetness may range from relatively short periods to year-round saturation. If the period of saturation is not too long the soils may develop only duller colors than their well-drained counterparts. A mottled color pattern occurs, which is the result of poor aeration and alternate reduction and oxidation of iron and other compounds in the presence of some organic matter. The process indicates restricted or imperfect drainage and the soils usually retain the major characteristics of their respective great group except for the grayish mottling pattern. A description of Gleyed Brunisolic subgroup is represented by West Point series and a typical profile of a Gleyed Gray Luvisol is portrayed (Fig. 7b) by Duvar series. In the survey area there are virtually no Gleyed Podzols. The podzolization process is drastically curtailed or appears to be greatly changed with restricted or imperfect drainage.

When excessive water remains in the soil for most of the year, aeration is very poor and gleying becomes the domainant process. Colors tend to be dull; strong gleying may dominate one or more horizons. Mottling may be intense but in island soils it is not strongly developed for a number of reasons. The red color masks the mottling, whereas low organic matter content and acidity slows

Table 8. Classification of the soils
Mineral soils

		Drainage; subgroup			
Mode of origin of parent material	Texture	Rapidly	Well and moderately well	Imperfectly	Poorly and very poorly
Glaciofluvial complex; eskers kames and outwash over glacial till or residual		Ortstein Humo-Ferric Podzol			Ortstein Humic Podzol
	Coarse	Bunbury			Wood Island
		Orthic Humic-Ferric Podzol		Gleyed Eluviated Dystric Brunisol	Orthic
		Dunstaffnage			
	Coarse				
	Moderately coarse		Culloden	Uigg	Rocky Point
	Medium		Newton	Hebron	Orwell
	Coarse overwash		Gowanbrae	Brackley	Orwell
Glaciomarine complex; mixed marine and associated noncompact material	Coarse	Kildare		Carey Point	Rocky Point
	Moderately coarse		Haliburton	Salt Grass Point	Mossy Point
		Eluviated Dystric Brunisol	Eluviated Eutric Brunisol	Gleyed Eluviated Eutric Brunisol	
	Moderately coarse		Haliburton Brook	Salt Grass Point	
	Medium	Dunblane		West Point	Baptist Point
	Moderately fine			Munn Road	Locke Road
	Coarse			Crapaud	
Glacial till compact moraine and ablation over residual		Orthic Dystric Brunisol	Orthic Humo-Ferric Podzol	Gleyed Eluviated Dystric Brunisol	
	Coarse	Emyvale	Alberry	Crapaud	Winsloe
	Moderately coarse	Emyvale	Charlottetown	Malpeque	Winsloe
			Podzolic and Brunisolic Gray Luvisol	Gleyed Gray Luvisol	Orthic Luvic Gleysol
	Medium		Tignish	Duvar	Margate
			O'Leary		
	Moderately fine		Fifteen Point	Wolfe Inlet	Egmont

or prevents the activity of microorganisms. Usually only the upper part of the profile becomes strongly gleyed. These poorly drained and poorly aerated soils are called Gleysols. An example of Orthic Gleysol subgroup is described under Winsloe series. Where significant translocated clay occurs in the B horizon (Bt) these soils are placed in the Luvic Gleysol subgroup and an example of the Orthic Luvic Gleysol subgroup is Margate series.

There are many small wet depressions in the Province where organic materials have accumulated. They lack horizons such as those found in mineral soils but display layers that reflect the vegetal origin and succession modified by decomposition. These organic soils fall in one of three great groups based on the degree of decomposition that occurs in the control section. The least decomposed are Fibrisols, those with well-decomposed control sections are Humisols, and those with intermediate decomposition are Mesisols. These organic soils are mapped in the survey area on an association basis in which the dominant subgroup only is described.

In the original survey of the soils of the province by Whiteside, all the well-drained soils were placed with the Podzol great group. Since that time some of the soils have been sampled and studied in detail by McKeague et al. (5). Reference to this paper gives research results on chemical and physical properties, mineralogy, micromorphology, and soil genesis for a drainage sequence of soils, namely Tignish, O'Leary, Duvar, and Margate series. It explains the major reasons for the changed classification for the soils studied.

Many fields being used for cultivated crops seem to have been significantly improved by the addition of large amounts of marine, pond, lake, or river sediments (muds). The application of muds to fields before the days of widespread commercial fertilizer use was an accepted means of maintaining crop production. Depending on the kind of mud used, this practice (mudding) not only made the plow layer less acid but also added plant nutrients as well as significant amounts of colloidal material, thereby increasing the volume of available water for crop production and the exchange capacity. The residual affects of mudding are difficult to document because the number of applications as well as the volume and quality of mud applied varied widely from field to field. No attempt was made in this survey to identify areas thus treated.

DESCRIPTION OF THE SOILS

In this section the mineral soil map units and organic soil associations are described in alphabetical order to provide general information on their extent, location, and characteristics of the soil profile and land surface. Brief mention is made of use and management mainly for agriculture. In the Land Use section more detailed information on utilization and capability of the soils is given. Miscellaneous land type units are discussed briefly at the end of the section.

Soil colors and their notations in the descriptions are those from Munsell color charts. The colors are for soils in the moist "m", dry "d", pressed "p", or wet "w" state, as indicated by these letters after the Munsell notation; for example (2.5YR 6/2m, 6/4d) indicates color value and chroma as 6/2 for the moist state and 6/4 for the dry state. The first-named color is the moist state. Analytical data for the profiles sampled are given in the Appendix.

Decomposition of organic soil materials is described by the abbreviations H1, H6, and so forth, which refer to the von Post scale of decomposition. The von Post scale is described briefly in section on Some characteristics and kinds of peat material.

Abney Road association

The Abney Road association occupies about 576 ha and consists of dominantly shallow (<160 cm) moderately decomposed organic soils. The soils are medium acid and derived from organic materials of mixed origin. The association occurs in eutrophic stream valley positions termed Stream Swamp landform. The surface peat layers have assumed a flood-free position with development of a relatively diverse plant community. The undisturbed soils support merchantable stands of mixed wood forest.

The water table is near the surface throughout the year and small pools are common. The soils have low bearing capacity because they are saturated and have little fiber in the peat material. Thin mineral layers of sand, silt, and clay mixtures within the peat may be common in some areas. Underlying sediments are dominantly fluvial but undifferentiated in terms of texture. The association includes several undifferentiated map units and only the most common is described below.

Use

The Abney Road association supports merchantable wood stands but yields are low and used mainly for fuel wood. Drainage by ditching would increase yields but costs for each area should first be carefully assessed for economic feasibility.

SITE DESCRIPTION
Location: N 45° 59' 47" W 62° 30' 28"
Landform: Stream Swamp; elevation 9.0 m A.S.L.
Drainage: Very poor; water table at the surface.
Vegetation: Forested (up to 40 cm diam.) dominantly maple, birch, fir, spruce, tamarack, willow, and alder with a ground cover of broadleaf species.
Classification: Terric Mesisol.

Horizon	Depth (cm)	Description
Om1	0-10	Dark brown (7.5YR 3/2m) moderately decomposed woody and mixed material; many small woody fragments; H6; medium acid.
Om2	10-20	Very dark brown (7.5YR 2/2m) moderately to well-decomposed amorphous organic materials; some roots and root fragments; H6; medium acid.
Om3	20-55	Dark brown and strong brown (7.5YR 3/2m and 5/6m) moderately decomposed material derived dominantly from sedge and mixed sedge-woody materials; H5; medium acid.
C	55+	Fluvial sands and silts.

Alberry map unit

Soils of the Alberry map unit are widely distributed on about 99 000 ha on gently undulating to rolling relief. The soils are well drained, strongly acid, and possess low fertility in their natural state.

Alberry soils have developed on glacial till. Texture of the parent material ranges from loamy sand to fine sandy loam with less than 8% clay and less than 35% silt plus clay. The till, dominantly ground moraine, is usually shallower than 2 m. It is underlain, frequently within 1 m of the soil surface, by interbedded sandstone-siltstone rock. The rock may be soft and weathered or contain relatively hard interbedded sandstone bedrock. These phases are indicated on the generalized map set by cross-hatching.

Soil profiles have formed under mixed coniferous and deciduous vegetation. Degree of horizon development is variable because of strong microtopography. Undisturbed profile sites have a thin organic surface over thin discontinuous mull (Ahe) horizon and prominent light-colored, leached (Ae) horizon 0 to 15 cm thick. The soft friable strong brown sandy loam B horizon ranges in thickness from 12 to 25 cm in accordance with the microtopography and grades downward through weakly altered material (BC) to unaltered (C) but acid material at 75 to 80 cm. Water tables are normally deep and internal drainage, or vertical water transmissibility, is relatively rapid to 50 or 60 cm, moderately slow below that depth, and variable or erratic in bedrock materials. The soils have only a few coarse fragments at the surface. Those that occur are mainly sandstone cobble, except for occasional granite erratics, which are more common in parts of Prince County. In some areas the soils are cobbly in the lower solum and parent material, particularly where they overlie sandstone bedrock at shallow depth. Alberry soils are found with those of the Charlottetown map unit and distinct separation of the two is, in certain areas, difficult and tenuous.

Use

A high percentage of the Alberry soils have been cleared and are used for a variety of crops. The soils are "early" and seedbeds are easily prepared. Limitations affecting use of the soils for crops include soil acidity, low organic matter levels, low natural fertility status and a lower than desirable moisture holding capacity for some crops. The soils erode easily under clean cultivation or when left without vegetative cover, particularly during spring when precipitation and snowmelt may combine with other factors to greatly increase water runoff and loss of valuable topsoil.

Agricultural crops grown include potato, cereal, corn, and other row crops, frequently in a 2- or 3-year rotation, on slopes less than 5%. Longer rotations are practiced for forage and pasture on steeper slopes because of erosion hazard. Generous applications of lime and fertilizer are essential to maintain crop yields. Forested areas have spruce, birch, and maple, often in exposed small blocks.

SITE DESCRIPTION
Location: N 46° 40' 29" W 64° 22' 27"
Drainage: Well drained; internal: rapidly pervious; site: slow runoff.
Vegetation: Birch, maple, and spruce, with understory of seedlings, bracken, ground hemlock, and hypnum moss.
Topography: A 4% south-facing slope with hummocky surface; elevation 41 m A.S.L.
Classification: Alberry sandy loam series; Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
LFH	9-0	L, F layers 5 cm thick. Dark reddish brown (5YR 3/3m) H layer; many roots and mycelium.
Ahe	0-5	Dark brown (7.5YR 4/2m, 10YR 7/2d) sandy loam; moderate fine and medium granular; friable; abrupt, broken boundary.
Ae	5-18	Light reddish brown (5YR 6/3m, 10YR 7/2d) sandy loam; weak, fine granular; loose; abrupt, wavy boundary; 0-15 cm thick.
Bf	18-33	Yellowish red (5YR 4/8m, 10YR 6/6d) fine sandy loam; moderate, fine granular; very friable, slightly sticky; wavy boundary; 12-25 cm thick.
BC1	33-53	Dark red (2.5YR 3/6m, 5YR 6/4d) fine sandy loam; weak, fine granular; very friable; porous.
BC2	53-84	Weak red (10R 4/5m, 2.5YR 6/4d) loamy sand; firm in place but friable when removed.
C	84+	Weak red (10R 4/4m) loamy sand till.

Arlington association

The Arlington association occupies about 972 ha and consists of strongly acid organic soils developed on very deep (>160 cm) sphagnum peat, and shallow (40-160 cm) sphagnum peat overlying forest or fen peat. The soils are underlain by undifferentiated mineral materials. They are poorly drained and have a fluctuating water table.

The Arlington association is found on the Domed Bog landform. This landform has an elevated area that is considerably higher than the margin; thus its central area receives water in the form of precipitation only. It may or may not have a hummocky microrelief. During the summer months this landform has a relatively low water table and its higher areas are frequently co-occupied by xerophytic plant species. The Domed Bog landform is a treeless or nearly treeless landform but dwarfed black spruce, tamarack, and occasionally pine may be seen. The height of the shrubs varies considerably, generally lowest in the centre and highest near its margin, thus showing the extreme sensitivity of the plant community to slight changes in soil-water nutrient concentration.

Frequently the Domed Bog landform is characterized by a comparatively steep marginal slope that is often occupied by a ribbon of trees. The soils of the Domed Bog landform are, in the undisturbed state, dominantly Typic Fibrisols, with a sphagnic surface. The soils in the margin area and outside it have properties that enable them to be classified as Fibrisols, Mesisols, or Humisols.

The peat-forming vegetation on the Domed Bog landform includes a number of bryophytes, the dominant being the acid-tolerant sphagnum species. The low (10-60 cm) shrubs include lambkill, rhodora, leatherleaf, pale laurel, blueberry, and sometimes cranberry. Peat accumulation forms the raised landform surface primarily because of the rapid growth of sphagnum species rather than of other moss species, and to a lesser extent to the slower decomposition rate relative to the margin area. The decomposition rate is slower because the higher acidity and lower nutrient content of the peat material provides a hostile environment for microorganisms. The effect of fire introduces mesophytic conditions and a more varied plant community.

The Arlington association includes other landforms too small to be mapped separately as well as other map unit types within the Domed Bog landform.

Use

None of these soils have been improved for agricultural crops. A few areas are being mined for horticultural peat moss production. The capability of organic soils is discussed in a later section.

SITE DESCRIPTION

Location: N 46° 40' 16" W 64° 02' 32"
Landform: Domed Bog; elevation 5 m A.S.L.
Drainage: Very poorly drained.
Vegetation: Sphagnum species, lambkill, rhodora, reindeer moss, sedges, and black spruce less than 5 m in height.
Classification: Typic Fibrisol.

Horizon	Depth (cm)	Description
Of1	0-40	Dark yellowish brown (10YR 4/4m) coarse fiber, almost undecomposed sphagnum moss; very porous; extremely acid; diffuse horizon boundary.
Of2	40-180	Strong brown (7.5 YR 4/5m) moderately coarse fiber, undecomposed sphagnum moss; porous; extremely acid.
Of3	180-300	Strong brown (7.5YR 4/5m) medium and coarse fiber, undecomposed sphagnum moss; extremely acid.
Cg	420+	Reddish brown silty sediments.

Baptist Point map unit

The Baptist Point map unit consists of poorly and very poorly drained soils developed on reddish brown, medium textured glaciomarine or modified noncompact glacial till materials. The soils occupy only about 1100 ha in the coastal fringe area of southwestern Prince County. Individual soil areas are usually of small size and variable in degree of stratification and reaction.

Stratified materials may be slightly alkaline, associated non-compact material may be acid to neutral. Texture of the parent material (50 to 100 cm in depth) may include sandy but not clayey contrasting layers. Textural variations are indicated on the detailed maps by phase symbol; BpI indicates soil areas having coarse and moderately coarse textured horizons, and BpJ indicates areas having medium and finer textured horizons in the upper 50 cm of soil.

The topography is depressional to very gently undulating. The water table is at or near the surface for most of the year.

The soils are dominantly under forest cover that consists of slow-growing mixed stands of maple, birch, spruce, cedar, fir, tamarack, and alder. The ground cover vegetation is moss, sedge, and various broadleaf species.

Use

The soils are unsuitable for agriculture in their present condition. Drainage improvement is difficult because of the lack of grade for surface ditches and the very slow subsoil permeability.

SITE DESCRIPTION
Location: N 46° 36' 20" W 64° 16' 32"
Drainage: Poor and very poor; internal: slowly pervious; site: very slow runoff.
Vegetation: Slow-growing fir, maple, and spruce; understory is sphagnum and haircap moss, sarsaparilla, aster spp., fern spp., and sedge.
Topography: Level to very gently undulating; elevation 8 m A.S.L.
Classification: Orthic Gleysol.

Horizon	Depth (cm)	Description
Om	12-0	Black to dark gray peaty mor organic layer; amorphous, greasy in lower part; abrupt, smooth boundary. acid; diffuse horizon boundary.
Aeg	0-10	Pale red (2.5YR 6/2m, 6/1d) silt loam; amorphous; slightly plastic; abrupt, wavy boundary.
Bg1	10-25	Yellowish red (5YR 4/8m, 6/6d) gravelly silt loam; weak, coarse platy breaking to weak, medium subangular blocky; slightly sticky, plastic; gradual, smooth boundary.
Bg2	25-38	Reddish brown (2.5YR 4/4m, 6/5d) silt loam; weak platy breaking to medium, subangular blocky; sticky, plastic; firm, hard.
C	38-100	Reddish brown (2.5YR 4/4m) silt loam material that may be residual or marine modified.

Brackley map unit

Soils of the Brackley map unit are imperfectly drained; they have slow surface drainage, and the till subsoil permeability is slow. About 1100 ha have been indicated for the map unit. Most of this occurs in Prince County but small areas are mapped in all counties.

The soils are developed on less than 100 cm of coarse textured, strongly acid glaciofluvial or modified material that overlies compact glacial till or soft bedrock residual material. Associated well-drained soils belong to the Gowanbrae series and poorly drained counterparts are placed with the Orwell soils.

Vegetation consists dominantly of spruce, fir, tamarack, and alder with some maple and birch on forested sites. Profiles have deeply leached and mottled Ae horizons underlain by thin, weakly cemented Bh horizon, indicative of an alternating water table. The water table is near the soil surface during the early growing season but below the upper B horizon by the middle of the growing season.

Use

Brackley soils require drainage improvement before they can be made very productive for agricultural crops. Drainage of fields or parts of fields can be improved with subsurface drainage or by surface ditches in some areas. The soils require lime and fertilizers, deep tillage, and organic matter to improve moisture holding capacity.

SITE DESCRIPTION
Location: N 46° 30' 46" W 63° 49' 46"
Drainage: Imperfectly drained; internal: slowly pervious below 75 cm; groundwater depth variable; site: medium runoff.
Vegetation: Red spruce, fir, poplar, maple, birch, blueberry, bracken, bayberry, hypnum moss.
Topography: A 2% south-facing slope; elevation 24 m A.S.L.
Classification: Gleyed Eluviated Dystric Brunisol.

Horizon	Depth (cm)	Description
LH	8-0	Felty mor; dark reddish brown (5YR 2/2m); 5-12 cm thick.
Aegj	0-25	Pinkish gray (5YR 6/2m, 7/1d) loamy fine sand; single grain; loose; many medium and coarse roots; few fine distinct mottles; abrupt, wavy boundary.
Bhgj	25-33	Dark red (2.5YR 2/4m, 5YR 4/2d) fine sand; coarse platy; cementing in peds; friable, nonsticky; plentiful fine and medium roots; clear, wavy boundary; 3-8 cm thick.
Bmgj1	33-53	Strong brown (7.5YR 5/6m, 5/6d) fine sand; single grain; loose, nonsticky; very few fine roots.
Bmgj2	53-75	Strong brown (7.5YR 5/6m, 6/6d) loamy sand; coarse faint mottles; single grain; loose; gradual, smooth boundary.
IICgj	75+	Red (10R 4/4m, 5/6d) fine sandy loam glacial till.

Bunbury map unit

Soils of the Bunbury map unit are rapidly drained; they have good surface drainage and rapid internal water transmissibility. The soils extend 200 ha. They occur mainly in the eastern part of the province. Bunbury soils also occur in complex with the Culloden map unit, but these areas are not included in the 200 ha.

The soils occur on gently undulating, hummocky and strongly acidic, coarse, glaciofluvial parent material. Profiles are similar to Culloden soils but differ in having within or below the Bf horizon a weakly developed, frequently shattered ortstein horizon. The soil normally has a deep Ae horizon over a moderately developed podzol B horizon.

Vegetation of forested areas is mixed, mainly birch, maple, spruce, fir, poplar, and occasionally pine. Fire barrens and ericaceous heath-type vegetation are common in some areas.

Use

Because of coarse textures and rather low organic matter levels, Bunbury soils have rather low moisture-holding capacity. They are poorly suited for pasture and forage crops but many areas are acceptable for crops such as blueberry, tobacco, early potato, and cereal. Many fields being used for cultivated crops were previously mudded and give acceptable yields without irrigation. The soils are acid and infertile in their natural state and require addition of lime, organic matter, and nutrients as continuing inputs for acceptable productivity.

SITE DESCRIPTION
Location: N 46° 00' 59" W 62° 46' 23"
Drainage: Well drained; internal: rapidly pervious; site: rapid surface runoff.
Vegetation: Mixed forest, regenerating: red maple, white birch, spruce, fir, and tamarack.
Topography: A 1% southwest slope; strong microtopography; elevation 40 m A.S.L.
Classification: Ortstein Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
LFH	3-0	Very dark gray (5YR 3/1m) F horizon; H horizon very thin; abrupt, smooth boundary.
Ae	0-18	Pinkish gray (5YR 7/2m, 10YR 7/2d) loamy sand; single grain; loose, nonsticky; plentiful fine roots; abrupt, irregular boundary; 5-20 cm thick.
Bhf	18-20	Yellowish red (5YR 5/6m, 6/4d) loamy sand; moderate, fine granular; friable, nonsticky; weakly cemented fragments; plentiful fine roots; abrupt, broken boundary; 1-5 cm thick.
Bfcj1	20-33	Yellowish red (5YR 5/6m, 6/4d) loamy sand; moderate, fine granular; friable, nonsticky; plentiful fine roots; shattered ortstein fragments; clear, wavy boundary; 8-45 cm thick.
Bfcj2	33-50	Reddish brown (2.5YR 4/4m, 5RY 6/4d) loamy sand; weak, fine granular; friable, nonsticky; discontinuous cementation; 10-25 cm thick.
BC1	50-75	Reddish brown (2.5YR 4/4m, 5YR 6/4d) fine sandy loam; single grain, loose; diffuse, wavy boundary.
BC2	75-101	Reddish brown (2.5YR 4/4m) gravelly loamy sand; loose; single grain.
C	101+	Reddish brown (2.5YR 4/4m) gravelly loamy sand residual material.

Canavoy association

The Canavoy association occupies about 117 ha and consists of acid organic soils developed on 40 to 160 cm of moderately to well-decomposed organic debris derived dominantly from woody material. The association is found on Spring Swamp landform underlain by undifferentiated mineral materials. These are eutrophic peat landforms that occupy discharge areas of seeping aquifers. The surface of the landform is normally smooth and relatively firm. The water table may fluctuate seasonally, depending on the discharge volume of the aquifers.

The soils in the association consist dominantly of Terric Mesisols and Terric Humisols developed on woody, moderately to slightly acid peat material. A profile description of the Terric Mesisol member is described below.

Use

The undisturbed soil has merchantable mixed wood stands of variable yields and quality. Although yields would improve with drainage the cost may be prohibitive. The soil has little or no potential for agricultural crops.

SITE DESCRIPTION

Location: N 46° 18' 46" W 62" 40' 24"
Landform: Spring Swamp; elevation 25 m A.S.L.
Drainage: Very poorly drained; water table at or near the surface.
Vegetation: Dominantly maple; spruce (up to 40 cm dbh); understory includes Canada yew, lambkill, twinflower, bunchberry, and sedge.
Classification: Terric Mesisol.

Horizon	Depth (cm)	Description
Om1	0-43	Very dark gray (7.5YR 3/1m) moderately to strongly decomposed woody material; amorphous, greasy; H.6; medium acid.
Om2	43-80	Black (10YR 2/1m) moderately to strongly decomposed woody organic material mixed with mineral sediment; H.6; amorphous; medium acid.
Of	80-100	Very dark brown (10YR 2/3m) weakly decomposed sedge material; H.4; medium acid.
Cg	100+	Munsell reddish brown (5YR 5/3m) strongly mottled fluvial sands and silts.

Carey Point map unit

Soils of the Carey Point map unit are imperfectly drained with water tables within 50 cm of the soil surface during the early part of the growing season. The soils are developed on coarse textured glaciomarine materials. The upper part of the profile is strongly acid, whereas the parent material may be acid or neutral.

The soils cover about 1500 ha, mainly in the coastal fringe area of Prince County. Individual areas are small. The relief is level to gently undulating.

Most of the soils are forested. Vegetation consists of mixed wood with spruce, maple, and tamarack as common species. Undisturbed sites have a peaty organic surface over a prominent, light-colored Ae horizon and usually with a distinctly mottled Bmgj horizon. Parent materials have a variable content of gravel and cobble fragments with surface horizons being of various textures. On the detailed soil maps certain textural phases are indicated; CpI denotes coarse and moderately coarse textures in the upper solum (0 to 50 cm depth), whereas CpJ indicates finer textured material.

Use

Few areas of the Carey Point map unit have been improved for use. Intensive crop production, after drainage, is feasible but the water table needs to be controlled to help supply crop needs.

SITE DESCRIPTION

Location: N 46° 55' 37" W 64° 11' 04"
Drainage: Imperfectly drained; internal: rapidly pervious; site: medium surface runoff.
Vegetation: Alder, spruce, wildrose, bayberry, dogwood, and scirpus.
Topography: Level to gently undulating; 23 m A.S.L.
Classification: Gleyed Eluviated Dystric Brunisol.

Horizon	Depth (cm)	Description
Apgj	0-15	Very dark grayish brown (10YR 3/2m, 6/2d) loamy fine sand; weak, fine granular; nonsticky, loose; abrupt, smooth boundary.
Aegj	15-29	Light gray (10YR 7/2m, 8/2d) loamy fine sand; single grain; faint mottles; nonsticky, loose; abrupt, wavy boundary; 3-30 cm thick.
Bmgj	29-70	Yellowish red (5YR 4/6m, 5/4d) fine sand; single grain; nonsticky, loose; coarse, faint mottles; gradual smooth boundary.
Cgj	70-100	Brown (7.5YR 5/4m, 6/3d) fine sand; loose.

Charlottetown map unit

Soils of the Charlottetown map unit are dominantly well drained, but a moderately well drained phase also occurs. Charlottetown soils have good surface drainage and adequate to rapid upper profile permeability, but below 50 or 60 cm the soils have fine porosity and slow hydraulic conductivity. The moderately well drained phase has slower surface drainage but other profile characteristics are only slightly modified. Charlottetown soils occupy the largest extent (about 188 000 ha) of any soil in the province. They intermingle with Alberry soils, which they closely resemble. The soils occupy a variety of slopes but a fairly high proportion of the landform is gently undulating or in the slope range of 0.5 to 5%.

Charlottetown soils have developed on strongly acid fine sandy loam glacial till or residual material. Clay content of the parent material varies from 8 to 18% and silt plus clay ranges from 35 to 50%. A shallow phase of the soil is shown on the generalized map set by cross-hatching. This phase has bedrock or residual material within 1 m of the soil surface. A number of other soil phases mapped are shown on the detailed (1:10 000 scale) maps. The dominant soil of the map unit is the Charlottetown series, an Orthic Humo-Ferric Podzol.

The soils of the map unit have developed under a climax hardwood forest or mixed forest vegetation. Undisturbed sites have strongly developed microtopography with cyclic profile development and some intermixing of Ae and Bf horizons. An Ahe horizon about 5 cm thick underlies the thin organic surface. The Ae and Bf horizons vary markedly in thickness over the microtopography: this can be seen in the the upper friable rooting zone of forested soils, which are alternately deep (more than 75 cm) and shallow (30 to 50 cm) over the dense slowly permeable subsoil and parent material.

Some soils included in the map unit have weak B horizons (Bfj or Btj) more representative of other soil orders. Some other soils may have weak fragipan characteristics. In cleared areas soil erosion and mudding of fields before about 1930 have altered the appearance of the soil.

Use

The Charlottetown soil is well suited to climatically adapted crops. The major advantages of the soil for agriculture over many other Maritime region soils are a rather uniform drainage pattern and a relatively stone free solum. Aside from the regional climate the soil management problems include soil acidity with medium to low organic matter levels and low nutrient content throughout the rooting zone, a restricted rooting depth (50 to 75 cm) over a poorly structured fragipan-like subsoil, and a solum that erodes easily.

SITE DESCRIPTION

Location: N 46° 20' 46" W 63° 26' 12"
Drainage: Well drained; internal: moderately to slowly pervious; site: rapid surface runoff.
Vegetation: Sugar maple with beech and scattered yellow birch, red spruce, and balsam fir.
Topography: A 3% south-facing slope; elevation 100 m A.S.L.
Classification: Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
LH	5-0	Partly decomposed leaf litter over thin mull-like moder.
Ae	0-10	Light reddish brown (5YR 6/4m, 6/2d) fine sandy loam; single grain; very friable; abrupt, irregular, and broken boundary with tongues to 20 cm.
Bf	10-30	Red (2.5YR 4/6m, 5YR 5/6d) fine sandy loam; moderate, fine and medium granular; nonsticky, very friable; abundant medium and fine roots; clear, wavy boundary.
Bm1	30-45	Red (2.5YR 4/6m, 5YR 5/5d) fine sandy loam; weak, medium subangular blocky; friable, slightly sticky, nonplastic; gradual, wavy boundary.
Bm2	45-60	Dark red (2.5YR 3/6m, 5/6d) fine sandy loam; weak, medium platy breaking to fine and medium subangular blocky; firm, friable; a few fine roots; gradual, wavy boundary.

Btj1	60-91	Dark red (2.5YR 3/6m, 5/6d) fine sandy loam; weak, coarse platy breaking to weak, medium subangular blocky; slightly sticky; few medium and fine roots; few fine pores; thin cutans; compact, dense; gradual smooth boundary.
Btj2+3	91-163	Dark red (2.5YR 3/6m, 5/6d) fine sandy loam; weak, coarse platy; slightly sticky; thin cutans; very compact; diffuse smooth boundary.
C	163+	Dark red (2.5YR 3/6m, 5/6d) loam; amorphous; very compact, dense.

Crapaud map unit

Soils of the Crapaud map unit have small extent (4000 ha). The imperfectly drained soils occur as small areas in the lower slope positions associated with the well-drained Alberry soils. Under cultivation the Crapaud soils are frequently improved by tile drainage or by removal of excess surface water by other means.

The parent material of the Crapaud soil is reddish brown loamy sand to fine sandy loam material having less than 8% clay and less than 35% silt plus clay. The soil is frequently strongly acidic unless altered by management. Profile morphology shows slight upper profile mottling and insufficient accumulation of Fe, Al, and organic complexes in the B horizon to qualify as a podzol; thus, the classification as Gleyed Eluviated Eutric Brunisol as reported or as Gleyed Eluviated Dystric Brunisol if too acid. Cultivated surface horizons are dark reddish brown and subsoils are friable usually to 100 cm, or more.

Use

Areas that have been cleared and drained are similar to Alberry soils in use and management.

SITE DESCRIPTION

Location: N 46° 19' 25" W 62° 52' 54"
Drainage: Moderately well to imperfect; internal: moderately pervious; site: rapid surface runoff.
Vegetation: Timothy clover hayfield.
Topography: A 2% southeast-facing slope; elevation 18 m A.S.L.
Classification: Gleyed Eluviated Eutric Brunisol.

Horizon	Depth (cm)	Description
Ap	0-18	Dark reddish brown (2.5YR 3/3m, 5YR 6/6d) fine sandy loam; few large faint mottles; moderate, medium and fine subangular blocky; friable, nonsticky; plentiful fine roots; abrupt, smooth boundary.
Aegj	18-22	Light reddish brown (5YR 6/3m, 7/2d) fine sandy loam; massive, loose; nonsticky; abrupt, wavy boundary; 0-5 cm thick.
Bmgj	22-40	Reddish brown (2.5YR 4/4m, 5YR 5/6d) fine sandy loam; weak, medium and fine subangular blocky; friable, nonsticky; common fine mottles; clear, smooth boundary.

Bm	40-90	Reddish brown (2.5YR 4/4m, 5/4d) fine sandy loam; weak, fine platy; friable, nonsticky; gradual smooth boundary.
C	90+	Reddish brown (2.5YR 4/4m, 6/4d) fine sandy loam.

Culloden map unit

Soils of the Culloden map unit occupy about 58 000 ha, mapped mainly in northeast Queens County and in Kings County. The map unit consists of well-drained to rapidly drained profiles developed dominantly on loamy sand to sandy loam strongly acid glaciofluvial materials.

The parent material of the unit includes a variety of materials within the glaciofluvial complex: intermixed tills, ice-sloughed debris, ablation or residual material. The parent material appears to have been deposited by a wasting or stagnant ice sheet that left a complex of valley-train deposits that include eskers, kames, kame terraces, valley-edge deposits, and minor outwash fans. The esker deposits, though small in length, are of common occurrence. These valley-train deposits grade into morainal deposits that are present at higher elevations.

The Culloden map unit includes a wide range of slope classes. Besides the modal soil developed on deep fluvial material, the map unit includes various soil phases. The dominant one is a bedrock phase (about 6200 ha) having residual material or bedrock within 100 cm of the soil surface. The residual material is dominantly sandy but thin silty layers also occur. The bedrock is sandstone, conglomerate, or mixed.

The forest on Culloden soils is composed of mixed hardwood-softwood with maple, birch, beech, oak, aspen, fir, spruce, pine, and hemlock as common species. Many areas previously cultivated have reverted to spruce or mixed wood associations.

Culloden soil profiles have deeply leached Ae horizons over distinct yellowish brown podzol (Bf) horizon. Water moves rapidly through the soil, which has a low moisture-holding capacity. Some soils have up to 10% by volume gravel, cobble, and sandstone flags on the soil surface but this occurs more commonly in the lower profile.

Use

Culloden soils are not widely used for agriculture. Although they are "early" in spring and seedbeds are easily prepared, the soils if cultivated intensively suffer a severe loss of organic matter, fertilizer, and structure. Considerable area is developed for potato, tobacco, cereal, forage, and cole crops but much of the land previously cultivated has been allowed to revert to forest. The soil requires generous and frequent applications of lime and fertilizer, plowing down of green-manure crops, suitable crop rotations, and other measures to control erosion. Past mudding practice improved many of the Culloden soils now being farmed. Net yields of many crops, at least over the short term, may be as high as those for Charlottetown soils. Culloden soils are less well suited for pasture and forage production because of lower moisture holding capacity. The soils have good potential for blueberry production, and encouragement for increased hectarage of this crop would seem to have merit. The major management problem aside from fertility and acidity is the rather rapid degradation of surface Ap horizons through lowered organic matter levels and deteriorating soil structure, cited previously.

SITE DESCRIPTION
Location: N 46° 22' 20" W 62° 50' 42"
Drainage: Rapidly drained; internal: rapidly pervious; site: rapid surface runoff.
Vegetation: Blueberry field (40% cover); weeds, shrubs, and browntop.
Topography: An 8% northeast slope; elevation 15 m A.S.L.
Classification: Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
Ap	0-20	Brown (7.5YR 5/2m, 5/3d) loamy sand; weak, medium and fine granular; very friable; abundant medium and fine roots; abrupt, smooth boundary.
Ae	20-33	Pinkish gray (5YR 7/2m) fine sand; weak, fine to medium granular; plentiful medium and coarse roots; abrupt, broken boundary; 0-55 cm thick.
Bfcj	33-46	Dark brown (7.5YR 4/2m, 4/4d) fine sand; moderate, medium granular; very friable, weak cementing in upper part of horizon; plentiful fine and medium roots; clear, wavy boundary; 10-15 cm thick.
Bm	46-61	Strong brown (7.5YR 4/6d) fine sand; weak, fine granular; very friable, nonsticky; plentiful medium and fine roots; clear, wavy boundary; 10-20 cm thick.
C	61-99	Yellowish red (5YR 5/6d) fine sandy loam.

Dunblane map unit

Soils of the Dunblane map unit cover about 1700 ha, mainly in the western part of the province. They consist of moderately well drained soils developed on medium textured marine and glaciomarine materials but include areas of associated non compact tills. The parent material is generally without stones and is frequently stratified. The soils are often acidic with medium to low exchange capacity and moderate to high base saturation. The soil reported is classified as Eluviated Dystric Brunisol but frequently very similar soils are encountered that are less acid. These are classified as Eluviated Eutric Brunisol.

The topography is level to gently undulating with slopes less than 5%. The cultivated reddish brown plow layer (Ap) has well-developed subangular blocky structure. Underlying horizon development usually is weakly expressed with weak platy structure and friable to firm consistence. Where the upper solum above 50 cm is variable in texture, soil phases have been delineated on the detailed (1:10 000 scale) maps. DbI indicates textures coarser than medium, DbJ indicates textures finer than normal.

Use
The soils are particularly well suited for pasture and forage crops but most crops adapted to the area can be grown. Most of the soils are cleared but their small extent and scattered distribution make them relatively unimportant in potential.

SITE DESCRIPTION

Location: N 64° 17' 04" W 46° 38' 30"

Drainage: Well drained; internal: moderately pervious; site: rapid surface runoff.

Vegetation: Pasture field; mainly brown top; timothy, weed species.

Topography: Gently undulating; 2% south-facing slope; elevation 10 m A.S.L.

Classification: Eluviated Dystric Brunisol.

Horizon	Depth (cm)	Description
Ap	0-18	Reddish brown (5YR 4/4m, 5/3d) loam; moderate, medium subangular blocky; slightly sticky, slightly plastic, friable; plentiful fine and medium roots.
Bm1	18-30	Yellowish red (5YR 4/6m, 6/6d) loam to silt loam; weak, fine platy breaking to fine, subangular blocky and fine granular; slightly sticky, slightly plastic, friable; many worm holes; clear, wavy boundary.
Bm2	30-50	Reddish brown (2.5YR 4/4m, 5/4d) loam; strong, fine and medium platy breaking to fine angular blocky; sticky, plastic; plentiful fine roots; few coarse pores containing wormcasts; gradual smooth boundary.
Bm3	50-75	Reddish brown (2.5YR 4/4m, 5/6d) silt loam; strong, medium platy breaking to fine and medium angular blocky; few fine roots; sticky, plastic, friable; very thin clay cutans on ped surfaces,
C	75-120	Reddish brown (2.5YR 4/4m) silt loam.

Dunstaffnage map unit

Dunstaffnage map unit (2700 ha) consists of soils that are excessively drained. They are developed from strongly acidic parent materials on eskers, kames, and other coarse textured deposits of the glaciofluvial complex, and from coarse textured ablation material and weathered conglomeratic sandstone. Coarse fragment content of the parent material frequently exceeds 35% by volume.

The topography is strongly undulating to hummocky with frequent short slopes and strong microtopography. Surface and internal drainage is rapid and the soils in general have low moisture-holding capacity. Vegetation consists of mixed hardwood-softwood, usually with an understory of blueberry, bracken, sweet fern, and other plants common to fire barrens.

In cleared areas the plow layer (Ap) varies from loamy sand to fine sandy loam with varying amounts of gravel and cobble. Often it is less than 15 cm thick, low in organic matter, with loose consistence and weakly developed structure. The underlying leached Ae horizon is in places deeply developed.

Use

The total area of Dunstaffnage soils is small. Substantial areas were cleared but have been allowed to revert to forest because of droughtiness and the difficulty of maintaining adequate levels of organic matter, lime, and nutrients. Several fields were heavily mudded in the past and some of these areas are now being productively farmed. In general the soils are marginal for agriculture and should be left in forest, or utilized for blueberry production or other use where feasible.

SITE DESCRIPTION
Location: N 46° 18' 41" W 63° 03' 08"
Drainage: Well to excessively drained; internal: rapidly pervious; site: rapid runoff.
Vegetation: Experimental plot; seeded to alfalfa.
Topography: A 5% southwest-facing slope; 25 m A.S.L.
Classification: Orthic Humo-Ferric Podzols.

Horizon	Depth (cm)	Description
Ap	0-20	Reddish brown (5YR 4/4m, 7.5YR 5/3d) fine sandy loam to loamy sand; moderate, medium to fine granular structure; nonsticky to slightly sticky, very friable; soft, nonplastic, frequently mudded in the past; abrupt, smooth boundary.
Ae	discontinues	Light reddish brown (5YR 6/3m, 6/2d) loamy sand; single grain to weak, fine granular; nonsticky, loose, nonplastic; clear broken horizon boundary; 0-25 cm thick.
Bf	20-30	Yellowish red (5YR 4/8m, 7.5YR 5/6d) loamy sand; moderate, fine granular; nonsticky, very friable, nonplastic; weakly cemented pockets; gradual, wavy boundary; 5-15 cm thick.
Bm	30-59	Yellowish red (5YR 5/6m, 5/4d) sand; nonsticky, very friable, loose, nonplastic; gradual boundary.
C1	59-90	Yellowish red (5YR 5/6m, 5/4d) sand; single grain; nonsticky, very friable, loose, nonplastic; gradual boundary.
C2	90+	Same as C1 horizon.

Duvar map unit

Soils of the Duvar map unit cover about 5200 ha, mainly in the western part of the province. They are the imperfectly drained member of the Tignish association of glacial till or residual soils that includes Tignish, O'Leary, and Margate series as well-drained, moderately well drained, and poorly drained, respectively. All these soils have developed from similar loam glacial till or residual parent materials having less than 18% clay. Duvar soils are imperfectly drained because of slow surface drainage and slow internal or vertical water transmissibility.

Duvar soils occupy level to gently undulating relief. The plow layer of cleared soils is distinctly grayer than the better drained members. Prolonged periods of surface saturation have resulted in thickly developed light-colored Aegj horizon, indicative of both gleying and eluviation. The B horizon has weak platy structure, low accumulation of amorphous material, and weakly expressd but thickly developed Bt horizon of clay accumulation. The soil is classified as Gleyed Gray Luvisol. Subsoil horizons are characterized by weak structure, high bulk density, low hydraulic conductivity, and mixed clay mineralogy consisting of mica, chlorite, kaolinite, and expansible minerals.

Vegetation of forested areas consists of slow-growing spruce, fir, maple, alder, and tamarack with a ground flora of mosses, lambkill, rhodora, and herbaceous plant species.

Use

Most of the Duvar soils that are cultivated occur as inclusions in better drained fields. The soils are slow to dry, resulting in delayed planting and harvesting, and in reduced productivity. Even with improved drainage the soil rooting zone remains shallow because of poor subsoil structure and porosity immediately beneath the plow layer. The soils probably cannot be adequately drained by tile underdrainage. Cleared soils are more suited to grass and forage production.

SITE DESCRIPTION

Location: N 46° 42' 50" W 64° 12' 03"
Drainage: Imperfect; internal: slowly pervious; site: slow surface runoff.
Vegetation: Spruce, fir, maple, a few alder, bracken, rhodora, sphagnum, and hypnum mosses.
Topography: A 1.5% north-facing slope; elevation 24 m A.S.L.
Classification: Gleyed Gray Luvisol.

Horizon	Depth (cm)	Description
LFH	5-0	F horizon thin; H horizon dark reddish brown (5YR 2/2m) moderately decomposed organic matter; peaty; abrupt, smooth boundary.
Aegj	0-17	Light brownish gray (10YR 6/2m, 7/2d) fine sandy loam; brown (7.5YR 4/4m) mottles; weak, medium platy; slightly sticky, slightly plastic, friable; clear, wavy boundary.
ABgj	17-24	Dark reddish brown (5YR 3/3d) loam; moderate, medium platy breaking to subangular blocky; few fine faint mottles; slightly plastic; weakly cemented nodules; clear, wavy boundary; 5-10 cm thick.
Bt1	24-32	Reddish brown (5YR 4/4m, 6/4d) loam; moderate, medium platy breaking to subangular blocky; slightly plastic; few fine pores; thin clay cutans; dense matrix; diffuse, smooth boundary.
Bt2+3	32-67	Reddish brown (2.5YR 4/4m, 5/6d) loam; amorphous; firm, slightly plastic; a few vertical gray fissures; few roots; thin clay cutans in common, random, fine and very fine pores; dense matrix; diffuse, smooth boundary.
BC	67-95	Reddish brown (2.5YR 4/4m) loam; compact; very firm; about 5% coarse cobble by volume.
C1	95-120	Loam grading into silt loam with depth.

Egmont map unit

Soils of the Egmont map unit have small total extent (about 1000 ha). This map unit consists of poorly and very poorly drained soils developed on medium to fine textured glacial till or residual material. Parent materials are dominantly silty clays; a few areas have clay loam textures.

The soils occupy depressional to gently undulating terrain in association with Margate soils, which they resemble. The Aeg and upper part of the Bg horizon is acid and strongly gleyed. The lower solum and parent materials are dense with weak platy to amorphous structure. Vertical water transmissibility is very slow and surface horizons remain saturated for long periods.

Vegetation consists of very slow-growing spruce, tamarack, alder, maple, and wire birch, with an understory of kalmia, rhodora, sphagnum, and other mosses as well as a few broadleaf herbaceous species.

Use

Egmont soils are difficult to drain because of very slow vertical water transmissibility of subsoils and the level to depressional terrain. Use after drainage is probably restricted to pasture and forage production. Areas having clay loam subsoil textures seem to have improved structure and subsoil permeability.

SITE DESCRIPTION

Location: N 46° 38' 00" W 64° 20' 35"

Drainage: Poorly drained; internal: slowly pervious; site: very slow surface runoff.

Vegetation: Old pasture field reverting to forest. A few alder, tamarack, poplar, wire birch, and poor-quality forage grasses and weeds.

Topography: Level to 1% south-facing slope; elevation; 8 m A.S.L.

Classification: Orthic Luvic Gleysol.

Horizon	Depth (cm)	Description
Apg	0-15	Dark reddish brown (5YR 3/2m, 4/2d) loam; moderate, medium subangular blocky; sticky, slightly plastic; common, distinct reddish gray mottles; abundant fine and medium roots; abrupt, smooth boundary.
Bg	15-25	Light reddish brown (2.5YR 6/4m, 6/6d) loam, some sandy spots; coarse subangular blocky to weak prismatic; plastic, hard; common, coarse, distinct mottles.
Btg	25-56	Dark red (10R 3/6m) clay loam; coarse, weak prismatic, breaking to subangular blocky; plastic, sticky, hard; common coarse faint mottles; fine and medium roots concentrated in fractures; common thin clay cutans; limestone nodules; gradual, smooth boundary.
Btgk	56-71	Red (10R 4/6m, 6/6d) silty clay; weak prismatic; plastic; dense; few hard limestone nodules; weakly alkaline.
BCk	71-91	Red (10R 4/6m) silty clay derived from shale; non-compact; weakly alkaline.
Ck	91-132	Silty clay as above.

Emyvale map unit

Soils of the Emyvale map unit are dominantly rapidly drained, but the unit also includes well-drained soils and some that are only moderately well drained. Soil profiles are less than 50 cm thick over sandstone bedrock or weakly consolidated sandstone-siltstone bedrock, and soil textures range from loamy sand to loam.

The soils are of very limited extent (about 300 ha). They occur in association with Alberry, Charlottetown, and Tignish map units. Surface and profile drainages are usually rapid where they occur in association with Alberry and Charlottetown soils. Where they intermingle with Tignish and O'Leary map units profile texture may be loam and subsoil permeability may be slow.

Use

Emyvale soil areas at worst are unsuitable for most crops because of shallowness and droughtiness; at best they have few physical restrictions for agriculture and are little different from most well-drained soils on the island. Where slopes are moderate to severe the soils are best maintained under grassland vegetation to protect from erosion. On gentle slopes the soils are used for most crops grown. Good management and conservation practices are necessary for sustained yields and to conserve valuable topsoil.

SITE DESCRIPTION

Location: N 46° 16' 45" W 63° 22' 32"
Drainage: Well drained; internal: moderately pervious; site: rapid runoff.
Vegetation: Hayfield, dominantly timothy and other grasses, some clover.
Topography: A 7% southeast-facing slope; elevation 67 m A.S.L.
Classification: Orthic Dystric Brunisol, very shallow lithic phase.

Horizon	Depth (cm)	Description
Ap	0-15	Reddish brown (5YR 4/3m, 5/3d) loam; moderate, medium granular; friable, slightly sticky, nonplastic; plentiful medium and fine roots; abrupt, smooth boundary.
Ae	15-17	Light reddish brown (5YR 6/3m, 7/3d) loam; single grain; very friable; abrupt, broken boundary.
Bm1	17-30	Reddish brown (5YR 4/4m, 6/4d) loam; moderate, fine and medium granular; friable, slightly sticky, nonplastic; plentiful fine and very fine roots; clear, wavy boundary; 10-18 cm thick.
Bm2	30-45	Red (2.5YR 4/6m, 5/4d) gravelly loam; weak, medium subangular blocky; friable; few fine roots; 59% of sandstone gravel and channers; clear, smooth boundary.
R	45+	Weakly consolidated sandstone bedrock.

Enmore association

The Enmore association consists of soils developed on shallow (less than 160 cm), moderately to strongly decomposed organic materials. The soils are poorly drained and influenced by eutrophic groundwater that is slightly acid to neutral.

The association is found on Basin Swamp landform having level to gently undulating relief. The total area of the association is small and scattered, mainly in the western part of the province. The dominant subgroup is a Terric Mesisol.

The vegetation is dominantly cedar but includes varying amounts of spruce, willow, and alder, with an understory of various herbaceous plants and mosses.

Use

The soils support merchantable stands of cedar. Because of cedar's resistance to rot it is cut for fence posts, shingles, and similar uses. Without drainage the soils are unsuitable for agriculture.

SITE DESCRITPION

Location: N 46° 39' 44" W 64° 13' 40"
Landform: Basin Swamp; depressional; elevation 20 m A.S.L.
Drainage: Very poorly drained; groundwater near the soil surface.
Vegetation: Dominantly cedar (15 to 40 cm dbh); a few maple, black spruce, and alder; understory includes ground hemlock, wood fern, rhodora, bunchberry, bristly black currant, twinflower, and other herbaceous plants and mosses.
Classification: Terric Mesisol.

Horizon	Depth (cm)	Description
Om1	0-13	Black (7.5YR 2/1w) moderately decomposed organic material; very weak, fine granular; plentiful fine and medium roots; medium acid.
Om2	13-32	Very dark brown (7.5YR 2/2w) moderately decomposed mixed woody and amorphous material; plentiful roots, many wood fragments; H6; medium acid.
Om3	32-50	Very dark brown (10YR 2/2w) moderately to strongly decomposed organic material; woody; H6; medium acid.
IICg	50+	Reddish brown fine sandy loam till; many grayish mottles.

Fifteen Point map unit

This map unit consists of moderately well drained soils developed on medium to moderately fine textured compact glacial till or residual material. The soils have small total extent (about 8000 ha) and occur around Earnscliffe and Orwell Cove in association with Tignish soils, which they resemble. They differ in having a finer textured profile and parent material, as well as having a Bf horizon that is too thin or weakly expressed to qualify the soil profile as podzolic. The dominant soil of the map unit is classified as Brunisolic Gray Luvisol.

Most of the areas are cleared and used for agricultural crops. The soils occur on gently undulating slopes, whereas the imperfectly drained Wolfe Inlet member occurs on lower slopes near the poorly drained Egmont soils.

Profiles of Fifteen Point soils are stone free, moderately to strongly acidic, with shallow rooting depth over compact but weakly expressed Bt horizon. Internal drainage, or vertical water transmissibility, is slow or very slow but site drainage is usually adequate to rapid.

Use

The soils are better suited to forage production and improved pasture than to other agricultural crops. The soils require lime and fertilizer to maintain adequate yields.

SITE DESCRIPTION
Location: N 46° 08' 00" W 62° 55' 45"
Drainage: Moderately well drained; internal: slowly pervious; site: rapid surface runoff.
Vegetation: Pasture field, dominantly timothy and browntop grasses.
Topography: Consists of 2% south-facing slopes; elevation 8 m A.S.L.
Classification: Brunisolic Gray Luvisol.

Horizon	Depth (cm)	Description
Ap	0-13	Reddish brown (5YR 4/3m, 2.5YR 7/3d) loam; moderate, medium granular; slightly sticky, slightly plastic, friable; many medium and fine roots; abrupt, smooth boundary.
Ae	13-15	Pinkish gray (5YR 7/2m) loam; amorphous to weak subangular blocky; nonsticky, slightly plastic; abrupt, broken boundary.
Bm	15-20	Yellowish red (5YR 4/6m, 7.5YR 7/3d) silt loam; moderate, medium subangular blocky, friable, slightly sticky; slightly plastic; few fine roots; clear smooth boundary.
Bt1	20-28	Reddish brown (5YR 4/4m, 6/4d) silt loam; amorphous to weak, medium subangular blocky; friable; few fine roots; common thin clay cutans; dense; clear, smooth boundary.
Bt2+3	28-76	Dark reddish brown (2.5YR 3/4m, 5YR 5/4d) silt loam; compact; weak, medium subangular blocky; very few roots; common thin clay cutans; less than 5% coarse fragments, diffuse, smooth boundary.
C	76+	Reddish brown (2.5YR 4/4m, 6/4d) silt loam; amorphous and dense; very firm glacial till.

Frenchfort association

The Frenchfort association consists of medium acid, dominantly shallow (40-160 cm) accumulations of organic materials. The peat material is moderately to slightly decomposed and developed under the influence of eutrophic brackish water. The soils are underlain by silty marine sediments and cumulo layers are often encountered in the profile. The soils are found on the nearly level Estuarine High Marsh landform, which is nearly always associated with the Salt Marsh Unit.

The landform is treeless. The frequency of inundation varies as does the nutrient and mineral content of the flood waters. The soils are variable in botanical origin and stage of decomposition. The dominant unit is a Terric Fibrisol. The soil described below occurred near the upland margin of the landform along the Hillsborough River north of Mount Stewart.

Use

A few areas have been used for rough grazing but in general the soils have little potential for drainage and development for agriculture.

SITE DESCRIPTION

Location: N 46° 22' 34" W 62° 50' 58"

Drainage: Very poorly drained; water table near the soil surface; floods infrequently.

Vegetation: Sweet gale; three-seeded sedge; spirea; sphagnum; bulrush, narrow-leaved cattail, and a few herbs.

Landform: Estuarine high marsh; evlevation 0.7 m A.S.L.

Classification: Terric Fibrisol.

Horizon	Depth	Description
Of1	0-10	Yellowish brown (10YR 5/6m) very weakly decomposed organic materials; porous; coarse; mostly sedge, mosses, and woody roots; H3; medium acid; clear boundary.
Of2	10-20	Reddish brown (5YR 3/4m) very weakly decomposed organic materials; porous; coarse; H3; acid; mostly rhizomes of cyperaceae with some moss, leaves, and stems; clear boundary.
Of-Om	20-120	Dark reddish brown (5YR 2/2m) weakly decomposed organic materials; H4; acid; mixture of woody and sedge fragments.
Cg	120+	Gray (5YR 6/1m) marine silt and sand sediments.

Gowanbrae map unit

Soils of the Gowanbrae map unit are well to rapidly drained. They are developed in coarse and moderately coarse textured water-deposited or modified material overlying glacial till within 100 cm of the soil surface. Profiles are strongly acidic throughout.

The soils are not extensive (about 3500 ha). Individual areas are small and occur in scattered patterns on a variety of slopes. In Prince County they occur in association with the imperfectly drained Brackley soils on gently undulating slopes. In northeastern Queens and Kings counties the soils are associated with Culloden soils along valley sides where these soils interface with soils developed on glacial till. The dominant soil of the map unit is an Orthic Humo-Ferric Podzol as respresented by the following description, taken at a site in northeastern Queens County.

Use

The dominant surface soil textures range from sand to fine sandy loam. The soil tends to be droughty but many fields have been mudded, which has improved their moisture-holding capacity. The soils resemble Culloden soils and for agricultural use there is little difference between them. In the use of both soils for cultivated crops organic matter levels can become very low, resulting in increased management problems. The soil requires generous and frequent applications of lime and fertilizers, the plowing down of green-manure crops, and suitable rotations.

SITE DESCRIPTION

Location: N 46° 18' 41" W 63° 03' 08"
Drainage: Well drained; internal: moderately pervious; site: rapid surface runoff.
Vegetation: Hay field, timothy, red clover, and grasses.
Topography: A 3-4% south-facing slope; elevation 25 m A.S.L.
Classification: Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
Ap	0-24	Reddish brown (5YR 4/4m, 7.5YR 4/4d) fine sandy loam; moderate, medium granular; very friable, slightly sticky, soft; plentiful medium and fine roots; abrupt, smooth boundary.
Ae	24-28	Light reddish brown (5YR 6/3m, 7/2d) fine sandy loam; very weak, fine granular; loose, nonsticky, nonplastic; clear, wavy boundary.
Bf	28-36	Yellowish red (5YR 4/6m, 7.5YR 5/6d) fine sandy loam; moderate, fine granular; nonsticky, nonplastic, very friable; clear, smooth boundary; 6-12 cm thick.
Bm1	36-54	Reddish brown (2.5YR 4/4m, 5YR 5/4d) fine sandy loam; weak, fine and medium subangular blocky; friable, slightly plastic; few medium and fine roots; 10% coarse fragments; gradual, smooth boundary.
Bm2	54-80	Reddish brown (2.5YR 4/4m, 5YR 5/6d) fine sandy loam; weak platy to single grain; gradual, smooth boundary.
IIC	80-100	Reddish brown (2.5YR 4/4m) fine sandy loam glacial till, compact in situ; 15% coarse fragments.

Haliburton map unit

Soils of the Haliburton map unit occur on moderately coarse textured acid glaciomarine or modified beach-like deposits. The soils are distributed mainly in Prince County on terrace below the 22 m contour. Approximately 7200 ha have been mapped. The soils are well drained dominantly Orthic Humo-Ferric Podzols.

The soils are mapped on a variety of slopes. On lower slope positions the soils intermingle with the moderately well drained associate, the Haliburton Brook map unit. The separation of the two soils is difficult because of the complex soil pattern and has been only reasonably well accomplished on the detailed maps.

Vegetation of forested areas consists of mixed wood stands of aspen, birch, maple, spruce, and fir.

Profiles are strongly acidic, dominantly fine sandy loam in texture, with deep rooting depths unrestricted by compact subsoils.

Use

The soils are suitable for most crops grown in the area. They are easily managed except where they occur in complex drainage patterns with the moderately well drained associate Haliburton Brook, and the imperfectly drained associate Salt Grass Point. Such fields with irregular drainage patterns can usually be improved with tile underdrainage for intensive crop production.

SITE DESCRIPTION
Location: N 46° 37' 53" W 64° 12' 31"
Drainage: Well drained; internal: moderately pervious; site: rapid surface runoff.
Vegetation: Abandoned pasture field; timothy, browntop, alder, spirea, and weed species.
Topography: A 6% south-facing slope; elevation 7 m A.S.L.
Classification: Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
Ap	0-16	Dark red (2.5YR 3/6m, 5/4d) sandy loam; strong, medium granular; slightly sticky, slightly plastic, very friable, plentiful roots; abrupt, smooth boundary.
Bf	16-36	Reddish brown (2.5YR 4/4m, 5/4d) sandy loam; strong, medium granular; slightly sticky, slightly plastic, very friable; plentiful roots; clear, wavy boundary.
Bm	36-55	Reddish brown (2.5YR 4/4m, 5/4d) sandy loam; weak, fine subangular blocky; nonsticky, nonplastic, very friable; gradual, smooth boundary.
C	55+	Sandstone bedrock; soft and disintegrated material.

Haliburton Brook map unit

Soils of the Haliburton Brook map unit are moderately well drained, and less than 2000 ha have been delineated on the detailed maps. Like the well-drained associate (Haliburton Map Unit), the soils occur in the coastal fringe area of Prince County. The parent material is moderately coarse textured marine or residual material that is alkaline to weakly acidic in reaction. The dominant soil of the map unit is classified as Eluviated Eutric Brunisol. The soils under forest have Ah horizons significantly less than 10 cm thick but when cultivated, Ap horizons are darker because the Ah horizon is mixed in.

The water table is frequently within the soil profile during the growing season, which for many crops improves the moisture regime relative to the well-drained associate member. Profile textures are dominantly fine sandy loam. The soils have few coarse fragments and a deep rooting depth unrestricted by the compact subsoils common to glacial till soils.

The relief is gently undulating with slopes less than 5%. Vegetation of forested sites is mixed woody stands of aspen, tamarack, birch, maple, spruce, and fir.

Use

The soils are suitable for most crops grown in the area. Frequently, fields have wet spots or irregular drainage patterns; these can be corrected by tile underdrainage for intensive crop production.

SITE DESCRIPTION
Location: N 47° 00' 16" W 64° 01' 36"
Drainage: Moderately well drained; internal: moderately pervious; site: medium surface runoff.
Vegetation: Eastern white cedar, alder, tamarack, and spruce; previously cultivated field.
Topography: A 2% northwest-facing slope, level microtopography; 8 m A.S.L.
Classification: Orthic Eutric Brunisol.

Horizon	Depth (cm)	Description
Ap	0-18	Dark reddish brown (5YR 3/3m, 4/3d) sandy loam; moderate, medium, granular; nonsticky, very friable, nonplastic; plentiful, micro, random roots; smooth, abrupt boundary.
Bm1	18-28	Dark reddish brown (2.5YR 3/4m, 4/4d) loamy sand; weak, fine granular; nonsticky, friable, nonplastic; wavy, abrupt boundary.
Bm2	28-36	Dark reddish brown (2.5YR 3/4m, 5/4d) sandy loam; weak, fine subangular blocky; slightly sticky, friable, nonplastic; common, medium pores with very thin clay films; diffuse, horizon boundary.
BC1	36-51	Dark reddish brown (2.5YR 3/4m, 5/4d) fine sandy loam; weak, fine platy breaking to weak, fine, subangular blocky; slightly sticky, friable, nonplastic; diffuse, horizon boundary.
BC2	51-96	Dark reddish brown (2.5YR 3/4m) fine sandy loam; weak coarse platy; few fine and medium roots; worm holes and fine pores throughout profile; diffuse boundary.
C	96+	Dark reddish brown (2.5YR 3/4m) fine sandy loam; 14% of coarse, rotted sandstone fragments.

Hazelbrook association

The Hazelbrook association consists of soil developed on dominantly shallow (40-160 cm), mildly acidic, moderately to well-decomposed organic materials. The organic materials are derived from reeds, sedges, alders, and aquatic plants. Frequently, thin layers of mineral particles are present in profiles.

The Hazelbrook association of soils is found in eutrophic flood-plains along stream channels termed Stream Fen landform. Topographic position is similar to that of Stream Swamp landform but flooding regularly occurs on Stream Fen landform. The association is comprised of various map units, the most common soil profile is a Terric Mesisol.

Use

The soils are unsuitable for forestry or agriculture. Their wetness and topographic position present major difficulties in any program for improvements.

SITE DESCRIPTION
Location: N 46° 22' 52" W 62° 48' 00"
Landform: Stream Fen; elevation 40 m A.S.L.

Drainage: Very poorly drained, floods frequently.
Vegetation: Alder, elderberry, three-seeded sedge, various broadleaf species, and grasses.
Classification: Terric Mesisol.

Horizon	Depth (cm)	Description
Om1	0-25	Very dark gray (5YR 3/1m) strongly decomposed organic material; washed sand grains; plentiful medium and coarse root fragments; amorphous matrix; H6; gradual, smooth boundary.
Om2	25-50	Black (5YR 2.5/1m) strongly decomposed; high ash content; wood fragments less than 10% by volume amorphous; H6; abrupt, smooth boundary.
IICg	50+	Black (5YR 2.5/1m) thin, strongly decomposed organic layers in silt loam.

Hebron map unit

Soils of the Hebron map unit have developed on medium textured small proglacial pond deposits within the complex of glaciofluvial surficial deposits. The parent material overlies at shallow depth either glacial till or residual material. They are of very limited extent (about 100 ha).

The soils are imperfectly drained because both surface drainage and internal profile permeability are slow. The soils remain saturated late into the growing season because of slope seepage from adjacent soils. Hebron soils are associated in the landscape with Newton soils, their well drained counterparts. Profiles and parent materials are strongly acidic.

The Hebron map unit occurs on gently undulating relief, usually on lower slope positions. Most forested sites have dominantly spruce, tamarack with maple, birch, or alder.

Use

The soils require surface ditching to remove surface water more rapidly. The soils after drainage are suitable for most crops grown in the area, but they require amelioration by lime, nutrients, and deep tillage to improve depth of rooting. Otherwise, they are best suited for forage and pasture crops.

SITE DESCRIPTION
Location: N 46° 01' 24" W 62° 54' 20"
Drainage: Imperfectly drained; internal: slowly pervious; site: medium to slow surface runoff.
Vegetation: Cultivated field seeded to barley.
Topography: A 6% northwest-facing slope; 32 m A.S.L.
Classification: Gleyed Eluviated Dystric Brunisol.

Horizon	Depth (cm)	Description
Apgj	0-16	Dark reddish gray (5YR 4/2m, 7/4d) silt loam; weak, medium and fine subangular blocky; friable; slightly sticky, nonplastic; pH 4.5; abrupt, smooth boundary.
Aegj	16-20	Reddish gray (5YR 5/2m, 10YR 7/4d) silt loam; weak, medium platy; friable, slightly sticky, nonplastic; clear, broken boundary.
Bm	20-40	Reddish brown (2.5YR 4/4m, 6/4d) silt loam; weak, medium subangular blocky; friable, slightly sticky, nonplastic; few roots; clear, smooth boundary.
IIBm	40-60	Reddish brown (2.5YR 4/4m, 6/4d) fine sandy loam; weak, medium platy; firm, friable, nonsticky, nonplastic; gradual, smooth boundary.
IIC	60+	Reddish brown (2.5YR 4/4m, 6/4d) fine sandy loam till, amorphous to weakly bedded; pH 4.2

Kildare map unit

Soils of the Kildare map unit occupy approximately 6800 ha. The drainage class of the unit ranges from well to rapid. The surface drainage is rapid, and because of high profile permeability and low moisture holding capacity the soils tend to be droughty. The soils are developed on coarse textured acidic glaciomarine beach-like deposits, but areas that have coarse modified residual materials have been included. The beach materials were deposited during a period of postglacial marine overlap (10). They occur mainly in Prince County in a coastal fringe below the 22 m contour. Kildare soils are found with their imperfectly and poorly drained associate members (Carey Point and Rocky Point) as well as with soils of the Haliburton map unit.

Parent materials of Kildare soils range in texture from sand to loamy sand with variable content of gravel. Profiles are strongly acidic, with deep light-colored leached Ae horizon and well-developed yellowish red B horizon enriched with Fe, Al, and colloidal organic matter. The dominant soil of the map unit is an Orthic Humo-Ferric Podzol.

The soil is mapped on a variety of slopes but the dominant is gently undulating to level. The water table is normally deep but many areas occur in complex pattern with depressional relief where the water table is relatively shallow.

Vegetation of forested areas consists of poplar, birch, and maple, with variations of spruce, pine, and other types. Many areas near the coast have low shrub vegetation, which includes lambkill, rhodora, leatherleaf, and blueberry.

Use

In many areas the soils are too droughty for agricultural crops and irrigation is necessary for acceptable yields. In other areas the soils have finer texture or water tables may be relatively shallow and thus influence the moisture regime. Many of these soils can be managed for tobacco, cereal, cole, alfalfa, and clover. Much of this soil is used for blueberry production.

Organic matter levels should be maintained or increased and all soils require frequent addition of lime and fertilizers.

SITE DESCRIPTION
Location: N 46° 38' 59" W 64° 22' 48"
Drainage: Well drained; internal: rapidly pervious water table about 2 m deep; site: rapid runoff.
Vegetation: Previously cultivated field regenerating to trembling aspen, pincherry, maple, spruce, alder, willow, and dogwood.
Topography: A 2% south-facing slope; elevation 16 m A.S.L.
Classification: Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
Ap	0-18	Reddish brown (2.5YR 4/4m, 5/4d) sandy loam; weak to moderate, fine granular; very friable, nonsticky; abrupt, smooth boundary.
Ae	18-25	Weak red (2.5YR 5/2m, 6/2d) loamy sand; single grain; loose, nonsticky; clear, wavy boundary.
Bf	25-38	Reddish brown (2.5YR 4/4m, 5/4d) sandy loam; weak, fine granular; very friable, nonsticky; plentiful medium roots; common fine random pores; clear, wavy boundary.
Bmcj	38-61	Yellowish red (5YR 4/6m, 6/3d) loamy sand; weak, fine granular; weakly cemented, smooth boundary.
BC	61-109	Dusky red (10R 3/3m, 5/4d) gravelly loamy sand; single grain; loose, nonsticky; 25% coarse fragments; abrupt boundary.
C	109+	Reddish brown (2.5YR 4/4m, 5YR 5/4d) fine sand sediments.

Lake Verde association

The Lake Verde association consists of poorly drained acidic organic soils developed on dominantly shallow (40-160 cm) deposits of woody and sphagnic materials. The soils are generally moderately decomposed but humic layers and occasionally mineral materials may occur. The mesotrophic association is found on Horizontal Fen landform underlain by undifferentiated mineral material. The soils may support a merchantable stand of mainly softwood trees as opposed to mixed wood stands common to the Abney Road association. The topographic position of the landform is frequently near the upland margin of other swamp landforms or in the sluggish drainage channels of upland soils.

The soils consist of undifferentiated Terric subgroups. The dominant map unit is a Terric Mesisol but other subgroups are of frequent occurrence.

Use

The soils are unused except for the slow-growing black spruce, which is harvested from time to time.

SITE DESCRIPTION
Location: N 46° 18' 21" W 62° 46' 02"
Landform: Horizontal Fen.
Drainage: Very poor; water table near the soil surface.

Vegetation: Dominantly black spruce (15-20 cm dbh), tamarack, a few fir; understory includes various mosses: Polytrichum spp., Sphagnum spp., Hylochomium spp., and Hypnum spp., as well as Labrador-tea, rhodora, blueberry, bunchberry, creeping strawberry, and three-seeded sedge.

Classification: Terric Fibric Mesisol.

Horizon	Depth (cm)	Description
Om1	0-34	Very dark brown (10YR 2/2m) moderately to strongly decomposed woody and herbaceous material; many fine roots; H.6; acid.
Om2	34-44	Very dark brown (10YR 2/2m) moderately decomposed organic material mixed with olive (5Y 5/6d) sandy loam mineral sediments; acid.
Of	44-71	Very dark brown (10YR 2/2m) very weakly decomposed fibric organic material derived dominantly from sedge and other material.
IICg	71+	Strongly mottled reddish brown fine sandy loam till.

Locke Road map unit

Soils of the Locke Road map unit occupy less than 100 ha. They are mapped as single units, but more hectares are mapped in complexes with other soils along the south coastal margins of Prince County. These poorly or very poorly drained soils are developed on moderately fine textured marine or modified non-compact material. They occupy level and depressional to very gently undulating marine terraces associated with other stratified soils in the area of marine overlap.

Most of the soils are forested with maple, cedar, willow, spruce, tamarack, and alder. The understory, or ground flora, usually consists of a high proportion of broadleaf species. These forest sites usually have a thick, moderately decomposed, peaty surface, as well as a light-colored, gleyed Aeg horizon, which may be discontinuous or 15 to 20 cm thick. The B horizon is strongly mottled, dense, and very slowly permeable.

Many of the Locke Road soils are stratified within the solum. On the detailed soil maps such stratified areas may be identified as phases: LrI indicates medium or coarser textures in the solum (20 to 50 cm); LrJ indicates finer textures over this depth. Soil parent materials are usually slightly alkaline.

Use

Improving soil drainage is difficult because of slow subsoil permeability and low gradient, or lack of outfall. Use after drainage is generally limited to pasture or forage production.

SITE DESCRIPTION

Location: N 46° 38' 02" W 64° 37' 46"

Drainage: Very poorly drained; internal: slowly pervious; site: very slow surface runoff.

Vegetation: Recently cleared poor-quality pasture.
Topography: Level; 2 m A.S.L.
Classification: Orthic Gleysol.

Horizon	Depth (cm)	Description
Apg	0-18	Dark gray (10YR 4/1m, 7.5YR 6/4d) silty clay loam; amorphous to very weak, subangular blocky; many coarse prominent mottles (2.5YR 6/2m); slightly sticky, slightly plastic, firm; very hard; abrupt, smooth boundary.
Bg1	18-30	Red (2.5YR 4/6m, 5YR 6/4d) clay loam; very weak platy to amorphous; slightly sticky, slightly plastic, firm, very hard; common, fine, prominent mottles; very slow permeability; diffuse, smooth boundary.
Bg2	30-60	Red (2.5YR 4/6m, 5YR 6/4d) silty clay loam; amorphous; slightly sticky, plastic, firm; dense, slowly permeable material.
C	60-120	Reddish brown (2.5YR 4/4m, 5.6/4d) silty clay loam to silt loam.

Malpeque map unit

Soils of the Malpeque map unit are imperfectly drained. They have developed on moderately coarse textured acidic glacial till or residual material. The reddish brown sandy loam to loam material is similar to that underlying the Charlottetown soil.

The map unit is not extensive and cover approximately 18 000 ha. Individual areas are small and intermingle with the well-drained Charlottetown soil and poorly drained Winsloe soil on gently undulating topography. On the more level areas surface drainage is slow. The slowly permeable subsoil maintains the surface in a saturated state well into the growing season. Seepage areas are common on slopes where water moves downslope in the upper solum. Aquifers or springs emanating from the bedrock may be of frequent occurrence on mid and bottom slopes. These variations in moisture regime appear to have little effect on profile morphology. The soils have prominent light-colored Aegj horizons and faint to distinct mottling occurs in the B horizons. The dominant soil is classified as Gleyed Eluviated Dystric Brunisol.

Use

Malpeque soils require drainage before the soils become productive for agricultural crops. The soils are frequently used for rough pasture or forage with minimum drainage improvements. Drainage of fields and parts of fields can probably be improved by tile underdrainage; gravel backfill over the tiles may be necessary. Deep tillage with additions of organic matter or the plowing down of green-manure crops helps to improve the physical properties and productivity of the soil after drainage.

SITE DESCRIPTION

Location: N 46° 17' 54" W 63° 34' 48"
Drainage: Imperfectly drained; internal: slowly pervious; site: slow surface run-off.

Vegetation: Balsam fir, spruce, red maple, a few ferns, and sphagnum moss.
Topography: Level to gently undulating basin; elevation 45 m A.S.L.
Classification: Gleyed Eluviated Dystric Brunisol.

Horizon	Depth (cm)	Description
LH	5-0	Black to very dark gray (5YR 2.5/1m) moderately decomposed organic mat; abrupt, smooth boundary.
Aegj	0-18	Brown (7.5YR 5/2m, 7/2d) fine sandy loam; single grain to weak, fine granular; nonsticky, loose; few fine distinct mottles; abrupt, wavy boundary.
Bfgj	18-25	Yellowish red (5YR 5/6m, 6/6d) fine sandy loam; moderate, fine and medium granular; friable; clear, smooth boundary.
Bmgj1	25-38	Yellowish red (5YR 4/6m, 6/6d) loamy fine sand; weak, medium granular and subangular blocky; common, faint mottles; friable, firm; slightly sticky; nonplastic; clear, smooth boundary.
Bmgj2	38-61	Yellowish red (5YR 4/6m, 5/6d) loam; moderate coarse platy breaking to weak, medium subangular blocky; common, medium and coarse faint mottles; firm, sticky, slightly plastic; few, fine clay cutans; gradual, smooth boundary.
BC	61-86	Red (2.5YR 4/6m, 5/6d) loam; amorphous to weak, coarse platy; common, medium and coarse faint mottles; dense; firm, slightly sticky, slightly plastic; very thin clay cutans in fine, discontinuous, random, tubular pores; diffuse boundary.
C	86+	Red (2.5YR 5/6m) fine sandy loam compact till.

Margate map unit

Soils of the Margate map unit are poorly and very poorly drained. They cover about 25 000 ha, mainly in Prince County and the southeastern part of Queens County. They are developed on acidic, reddish brown glacial till and residual material. The glacial till of variable depth grades into soft bedrock easily removed with light machinery. The distinction of till from residual material is difficult and of little consequence from the viewpoint of profile morphology or land use for crops. Margate soils are developed on the same parent material as Tignish (well drained), O'Leary (moderately well drained), and Duvar (imperfectly drained) map units.

Margate soils occur on depressional to gently undulating relief. An apparent or perched water table is near the soil surface for prolonged periods. Most of the soils remain in mixed wood forest composed of spruce, fir, maple, wire birch, alder, and tamarack. A ground flora of Labrador-tea, lambkill, sphagnum, and other moss species is common. Profiles have peaty organic surfaces over thick gleyed (Aeg) horizon containing sesquioxide nodules that decrease in size and frequency in the lower horizons. Soil B horizons have an accumulation of translocated clay in a dense, poorly developed structure with many fine pores that transmit water very slowly. The profile is strongly acidic with low base saturation in upper horizons and higher saturation in lower ones. The soils are classified as Luvic Gleysol.

Use

Only small areas of Margate soils have been cleared and improved for agricultural use. Because the soils are difficult to drain adequately their use is generally restricted to pasture or production of grass forage. The costs of improving the soil for other crops may not be economically feasible or would have to be carefully assessed. They include clearing, drainage by ditching and crowning, lime, fertilizer, and deepening and maintaining rooting depths in the dense subsoil.

SITE DESCRIPTION

Location: N 46° 43' 59" W 64° 17' 02"
Drainage: Very poorly drained; internal: slowly pervious; site: very slow surface runoff; perched water table near the surface.
Vegetation: Speckled alder, red spruce, wire birch, tamarack, rhodora, Labrador-tea, and sphagnum.
Topography: A 0.5% southeast-facing slope; nearly level microtopography; elevation 46 m A.S.L.
Classification: Orthic Luvic Gleysol.

Horizon	Depth (cm)	Description
Om	2-0	Black to dark gray moderately decomposed peaty organic mat; abrupt; smooth horizon boundary.
Ae	0-5	Pinkish gray (7.5YR 7/1m, 8/1d) loam; amorphous; friable; plentiful roots; abrupt, wavy boundary.
Aeg	5-10	Pinkish gray (7.5YR 6/1m, 7.5YR 7/2d) loam; weak, fine platy; friable, hard; few roots; few medium iron-manganese concretions; clear boundary.
ABg	10-16	Pinkish gray (7.5YR 6/3m, 7/2d) loam; weak platy; friable, hard; common, thin clay films; common, medium iron-manganese concretions; clear horizon boundary.
Btgj1	16-22	Reddish brown (2.5YR 4/5m, 5YR 6/4d) loam; moderate, medium platy; common, coarse, faint mottles; firm, hard; plentiful fine roots; common, medium pores; common, thin clay films; few medium concretions; gradual boundary.
Btgj2	22-40	Reddish brown (2.5YR 4/5m, 5/5d) loam; weak, coarse platy, few coarse, very faint mottles; firm, hard; common, thin clay films; iron-manganese concretions; diffuse boundary.
Bt3	40-60	Reddish brown (2.5YR 4/5m, 5/5d) loam; coarse, angular blocky; firm, very hard; few roots; common, thin clay films; diffuse boundary.
Bt4	60-80	Reddish brown (2.5YR 4/5m, 5/5d) loam; amorphous; firm, hard; common, thin clay films on ped surfaces; diffuse boundary.
BC	80-100	Reddish brown (2.5YR 4/5m) loam; amorphous; firm, very hard, slightly plastic.
C1	100-142	Reddish brown (2.5YR 4/5m) loam glacial till containing about 10% coarse fragments.
Ck	142-190	Loam glacial till containing about 10% coarse fragments.

Mossy Point map unit

Soils of the Mossy Point map unit are poorly or very poorly drained. They have formed on moderately coarse textured water-deposited or modified materials of marine origin. The water table is at or near the soil surface most of the year. The upper solum is acidic but parent materials may be weakly acidic or alkaline.

The soil is not extensive (about 14 000 ha). Individual areas are small, located mainly in Prince County below the 22 m contour. Virtually none of the soils have been cleared. The soil has a thick peaty organic surface overlying a light-colored gleyed Aeg horizon. The underlying B horizon is strongly mottled but grades rapidly into reddish brown sediments relatively unaltered except for mottling.

Many soils are stratified and variable in texture in the solum. Textural phases are symbolized on the detailed soil maps: MpI indicates coarse and moderately coarse textures over the upper profile 20 to 50 cm in depth; MpJ indicates medium or finer textures are present.

The dominant soil of the map unit is classified as Orthic Gleysol.

Use

Few areas have been cleared for agriculture. If adequately drained, soils in the Mossy Point map unit are potentially productive for pasture, forages, and tree crops. Other potential uses depend on the texture of the solum, which may vary spatially from loamy sand to silty loam as well as on the kind of equipment used in crop production.

SITE DESCRIPTION

Location: N 46° 37' 48" W 64° 20' 57"
Drainage: Poorly and very poorly drained; internal: slowly pervious; site: very slow surface runoff.
Vegetation: Alder, white birch, spruce, and poplar with sedge, ferns, and mosses.
Topography: Level to depressional; less than 1% south-facing slope; 1 m A.S.L.
Classification: Orthic Gleysol.

Horizon	Depth (cm)	Description
Om	2.5-0	Black, poorly decomposed organic material.
Aeg	0-20	Dark gray (5YR 4/1m) loam; moderate, fine blocky; sticky, moderately plastic, friable; 15-30 cm thick; abrupt, smooth boundary.
Bg1	20-35	Red (2.5YR 4/6m) loam; weak, medium, angular blocky; sticky, moderately plastic; many coarse, faint, and prominent mottles.
Bg2	35-50	Red (2.5YR 4/6m) gravelly fine sandy loam and loamy sand, faint mottles; single grain; loose; porous about 22% of gravel.
IICkj	50+	Reddish brown stratified sediments ranging from gravelly loamy sand to silt loam layers overlying coarse beach deposits, weak effervescence.

Munn Road map unit

Soils of the Munn Road map unit are dominantly imperfectly drained; surface drainage is moderate to slow and internal soil drainage is restricted by dense subsoils. The soils are developed on coarse and medium textured glaciomarine sediments or associated non-compact tills. The parent materials are reddish brown, usually stratified and generally slightly alkaline in reaction.

The soils have small extent (about 500 ha). They are confined mainly to the southwest coastal area of Prince County on level to gently undulating relief. They are distributed in a complex pattern with other soils differing in texture or drainage but having similar origin. Forest vegetation is mixed hardwood and softwood for which the soil is moderately productive. Profiles of undisturbed sites usually have a thin organic surface over a dark reddish brown Ahe horizon 5 to 10 cm thick. The underlying B horizon has little accumulation of sesquioxide and organic material, weakly developed structure, dense fabric, weak mottling, and shallow depth of friable material.

The dominant soil of the map unit is classified as Gleyed Eluviated Eutric Brunisol.

Use

Few areas of Munn Road soils have been improved for agricultural use. Because of very unpredictable subsoil hydraulic conductivity, the use of tile underdrainage may not be acceptable or efficient. Most existing fields are used for hay or for permanent pasture.

SITE DESCRIPTION

Location:	N 46° 50' 48" W 64° 12' 41"
Drainage:	Imperfectly drained; internal: slowly pervious; site: slow surface runoff.
Vegetation:	White birch, yellow birch, spruce, alder, tamarack, maple, and fir.
Topography:	A 2% east-facing slope, slightly mounded microtopography; elevation, 16 m A.S.L.
Classification:	Gleyed Eluviated Eutric Brunisol.

Horizon	Depth (cm)	Description
LH	2-0	Mostly undecomposed leaves.
Ahegj	0-10	Dark brown (7.5YR 3/2m, 10YR 4/2d) loam; strong, medium granular; friable, nonplastic; abrupt, smooth boundary.
Bmgj1	10-31	Yellowish red (5YR 4/6m, 6/4d) fine sand; few coarse, faint mottles; weak, subangular blocky; nonsticky, loose; abrupt, smooth boundary.
Bmgj2	31-45	Red (2.5YR 4/6m, 5/6d) loamy sand; few coarse, faint mottles; loose; abrupt, smooth boundary.
C1	45-75	Red (2.5YR 4/6m, 6/6d) loam; amorphous; sticky, plastic, firm, hard; abrupt, smooth boundary.
C2	75+	Reddish brown (5YR 4/4m, 6/4d) loamy sand.

Newton map unit

Soils of the Newton map unit have a very limited extent (less than 200 ha). The soils are well drained; surface drainage and upper profile permeability is good but subsoil permeability below about 50 cm may be slow. The soils are associated with and in many respects resemble Culloden soils. They differ in having a finer textured solum and parent material, and in having formed on medium textured proglacial pond deposits within the complex of glaciofluvial surficial deposits. Because individual deposits are small the parent materials at shallow depth overlie either glacial till or residual materials. Soil profiles are strongly acidic.

The topography is gently undulating. On lower slopes the soils intermingle with the imperfectly drained associates of Hebron map unit.

Use

Newton soils have better water holding capacity than Culloden soils and are better suited for most crops. Because of their limited occurrence and scattered pattern they are relatively unimportant agriculturally, even though most areas are cleared and farmed.

SITE DESCRIPTION
Location: N 46° 08' 27" W 62° 40' 36"
Drainage: Well drained; internal: rapidly pervious; site: slow surface runoff.
Vegetation: Rough pasture, regenerating to spruce.
Topography: A 2% south-facing slope; elevation 21 m A.S.L.
Classification: Orthic Humo-Ferric Podzol.

Horizon	Depth (cm)	Description
Ap	0-20	Dark brown (7.5YR 4/4m, 10YR 6/3d) loamy sand; very weak, fine granular; loose, nonsticky; plentiful roots; abrupt, smooth boundary.
Ae	20-25	Light gray (10YR 7/2m) loamy sand; single grain; loose; abrupt, wavy boundary; 2-10 cm thick.
Bf	25-51	Yellowish red (5YR 5/8m, 7.5YR 6/6d) fine sand; moderate, fine to medium granular; very friable; few roots; clear, wavy boundary; 20-40 cm thick.
Bm	51-59	Yellowish red (5YR 4/6m, 6/6d) loamy sand; very weak granular; very friable, nonplastic.
IIC1	59-127	Red (2.5YR 5/6m, 5YR 6/6d) silt loam; medium, coarse platy breaking to medium, subangular blocky; slightly firm, slightly sticky, slightly plastic.
IIC2	127+	Red (2.5YR 5/6m) silt loam; firm to compact material.

O'Leary map unit

Soils of the O'Leary map unit are moderately well drained and have very limited extent (about 11 000 ha). The soils occur mainly in western Prince County and in areas around Charlottetown. They are associated in the landscape with Tignish (well drained), Duvar (imperfectly drained), and Margate (poorly drained) map units. They resemble Tignish soils but differ in having weak mottling in the upper profile and thinner Bf horizons. The Ap horizon of cultivated soils is faded or less red. The map unit occurs on lower slope or more level relief positions where surface drainage is slower.

The soil is developed on reddish brown loam glacial till or residual material. The clay content of the till is usually less than 18% and the sand content is about 50%. Subsoil and parent materials are moderately to strongly acidic and have compact dense fabric with few coarse fragments. Profiles are characterized by a prominent light-colored Ae horizon, and a thin (less than 10 cm) Bf horizon over a weakly developed horizon of clay accumulation (Btj).

The soil below 50 cm has bulk densities of 1.80 g/cm^3, or higher, and few coarse pores. Rooting depths therefore are shallow and seldom deeper than 35 to 40 cm.

Vegetation of forested areas consists of birch, maple, spruce, and fir, the most common species, and microtopography is less hummocky than on the well-drained Tignish soil. Abandoned agricultural fields revert to dominantly fir, tamarack, and alder. Except for surface horizons, organic matter levels are low and values decrease rapidly with depth from the soil surface. Base saturation of most horizons is below 50% but increases slightly in lower subsoils and parent materials.

The dominant soil of the map unit is classified as a Brunisolic Gray Luvisol. A representative profile is described below and analytical data are given in Tables 39 and 40.

Use

O'Leary soils are best suited for forage and grass production. They require lime to correct acidity and fertilizer to maintain adequate plant nutrients and crop yields. The soils are not well suited for cultivated crops. They are slow to warm up in spring and rooting depths are shallow. Subsoil drainage is very slow and trafficability of farm machinery can be difficult at planting and harvest, particularly during wet years. Tile underdrainage may be ineffective because of the slow subsoil permeability. Efforts to improve the surface drainage and to deepen rooting depths should prove beneficial for agricultural use of the soil.

SITE DESCRIPTION

Location:	N 46° 54' 26" W 64° 09' 12"
Drainage:	Moderately well drained; internal: slowly pervious; site: rapid surface runoff.
Vegetation:	Poor-quality pasture, regenerating to alder and spruce (abandoned farmland).
Topography:	Level; less than 0.5% northwest-facing slope; elevation 41 m A.S.L.
Classification:	Brunisolic Gray Luvisol.

Horizon	Depth (cm)	Description
Ap	0-20	Dark reddish brown (5YR 3/4m, 6/3d) loam; moderate, medium granular; slightly sticky, slightly plastic, friable; plentiful medium and fine roots; abrupt, smooth boundary.

Bm	20-29	Reddish brown (5YR 4/4m, 6/4d) loam; medium platy breaking to moderate, fine and medium granular; friable; nonplastic; plentiful medium and fine roots; clear, smooth boundary.
Bt1	29-56	Reddish brown (2.5YR 4/4m, 5/4d) loam; weak platy breaking to moderate, fine subangular blocky; few, medium, faint mottles; slightly sticky, slightly plastic, firm, hard; thin clay skins line simple, fine, random pores and some peds; dense; few fine roots; smooth, diffuse boundary.
Bt2	56-90	Similar to horizon above but platy structure is not present; very weak subangular blocky to amorphous; dense; compact.
C	90+	Reddish brown (2.5YR 4/4m, 5/4d) loam; very compact ground moraine.

Orwell map unit

Soils of the Orwell map unit are poorly and very poorly drained. They have very limited extent (about 7800 ha) and scattered distribution. The dominant soil of the map unit is classified as Orthic Gleysol.

Orwell soils are mapped on medium and moderately coarse textured glaciofluvial or modified materials. Orwell soils are associated in the landscape with Newton and Hebron map units, which are developed on medium textured parent materials.

Most of the soils support poor-quality forest. Dominant species include slow-growing and poor-quality stands of tamarack and spruce, with varying quantity of alder, maple, and birch. The relief is depressional to gently undulating. Surface drainage is slow and the water table is near the soil surface for most of the year.

Profiles are strongly acidic. Undisturbed sites have a thick, moderately decomposed peaty organic surface over a thick, light-colored gleyed Aeg horizon, over a prominently mottled Bg horizon. Profile organic matter levels, exchange capacity, and base saturation are low.

Use

In their present drainage condition the soils are poorly suited for forestry or agricultural crop production. It is doubtful if drainage for cultivated crop production is economically feasible. Where drainage can be improved the best use of the soils for crops is forestry, pasture, or forage production.

SITE DESCRIPTION

Location: N 46° 19' 36" W 62° 56' 00"
Drainage: Very poorly drained; internal: slowly pervious; site: surface runoff very slow.
Vegetation: Poor-quality pasture field, some alder, sedge, and sphagnum with intermixed grasses.
Topography: A 1% southeast-facing slope; elevation 15 m A.S.L.
Classification: Orthic Gleysol.

Horizon	Depth (cm)	Description
Apg	0-18	Grayish brown (2.5Y 5/2m, 6/2d) fine sandy loam; medium, coarse, subangular blocky; friable, slightly sticky, nonplastic; common, fine, yellowish brown (10YR 5/6m) mottles; abrupt, smooth boundary.
Aeg	18-25	Light brownish gray (2.5Y 6/2.5m, 10YR 6/2d) fine sandy loam; very weak, subangular blocky; clear, wavy boundary.
Bg	25-48	Yellowish red (5YR 4/6m, 5/6d) fine sandy loam; weak, medium platy breaking to medium, subangular blocky; sticky, slightly plastic; 80% of matrix mottled; diffuse, wavy boundary.
BCgj	48-90	Yellowish red (5YR 5/6d) fine sandy loam; coarse platy; coarse, diffuse, faint mottles; dense; firm; about 20% coarse fragments.
Cgj	90+	Yellowish red (5YR 5/6d) fine sandy loam compact till; about 5% coarse fragment.

Pisquid association

The Pisquid association is a complex of shallow (40-160 cm) and deep (>160 cm) moderately to well decomposed organic soils. The association consists of strongly acidic, very poorly drained soils on both oligotrophic and slightly mesotrophic peat sites developed on Bowl Bog landform. The mesotrophic members are situated near the bog margin and support a stand of generally unmerchantable black spruce that decreases in height toward the bog centre. The soils are dominantly Terric subgroups of Mesisols and occasionally Humisols. The central area of the bog has mainly deeper oligotrophic organic soils with sphagnic surface, underlain by mesic or more decomposed layers derived from mixed plant and woody materials as well as from sphagnum moss. Profiles are similar to those of the Pownal association.

A representative profile is described below, which may or may not be dominant over the association.

Use

The soils are unsuitable for forestry or agriculture. Their acidity, low natural fertility, wetness, and topographic position present major difficulties in any program for improvement.

SITE DESCRIPTION

Location: N 46° 17' 22" W 62° 37' 42"
Landform: Bowl bog.
Drainage: Very poorly drained; water table at the surface.
Vegetation: Leatherleaf; sphagnum moss, a few pitcher plants.
Classification: Terric Humic Mesisol.

Horizon	Depth (cm)	Description
Om1	0-15	Dark yellowish brown (10YR 4/4m) weakly to moderately well decomposed organic materials derived from sphagnum, woody, and sedge material; H.4; acid; clear, smooth boundary.

Om2	15-79	Dark reddish brown (5YR 3/2m) moderately to weakly decomposed peat material derived from woody and moss mixtures; H.4; acid; clear, smooth boundary.
Om3	79-94	Similar to horizon above but the woody fragments and mosses are moderately disintegrated in a well-decomposed matrix; acid; clear, smooth boundary.
Oh	94-116	Very dark grayish brown (10YR 3/2m) strongly decomposed peat; H.6; acid; abrupt, smooth boundary.
IICg	116+	Weak red (2.5YR 5/2m) silt loam.

Pownal association

The organic soils of the Pownal association have developed on deep (>160 cm) and shallow (40-160 cm) peat materials. The accumulations are derived dominantly from sphagnum mosses and ericaceous shrubs but may have minor amounts of coarse, woody material.

The association is underlain by undifferentiated mineral material and is found on the Flat Bog landform. The plant community is much like the Domed Bog landform, although the dwarfed trees and shrubs are somewhat taller. The soils have a seasonally fluctuating water table with very poorly drained soils, often along the bog margins.

Soils of the association are strongly acidic. They have a fibric surface of variable depth overlying a dominantly mesic layer or layers of mixed fibric or mesic material. Terric subgroups often may have humic layers of variable thickness. The association includes several subgroups; a Typic Mesisol is described here.

Use

The soils support only dwarfed trees and shrubs and are unsuitable for forestry under present conditions. Major reclamation is required before the soils can be made suitable for some agricultural crops or forestry use. No such recommendations are being made at present and each soil area must be considered on its own merit, taking all aspects into consideration.

SITE DESCRIPTION

Location: N 46° 26' 29" W 63° 33' 12"
Landform: Flat Bog; elevation 29.5 m A.S.L.
Drainage: Very poorly drained.
Vegetation: Black spruce, tamarack, leatherleaf, lambkill, pale laurel, Labrador-tea, small cranberry, pitcher plant, cotton grass, sphagnum moss, and reindeer moss.
Classification: Typic Mesisol.

Horizon	Depth (cm)	Description
Of	0-27	Dark reddish brown (5YR 3/3m) slightly to moderately decomposed sphagnum peat; H.4; clear boundary.
Om1	27-64	Black (5YR 2.5/1m) moderately well to well-decomposed sphagnum peat; H.6; very soft plant fragments such as roots recognizable; thin charcoal layer present; clear boundary.

Om2	64-85	Dark reddish brown (5YR 3/2m) moderately decomposed sphagnum peat; a few woody fragments; H.4-5; gradual boundary.
Om3	85-140	Similar to horizon above but slightly more decomposed; abrupt boundary.
Om4	140+	Black (5YR 2.5/1m) moderately well to well-decomposed sphagnum peat; H.6; soft plant fragments recognizable.

Rocky Point map unit

Soils of the Rocky Point map unit have a very limited extent (about 9000 ha). Individual soil areas are generally small, with depressional to gently undulating relief.

The soils are poorly to very poorly drained with water tables at or near the surface throughout most of the year. The soils are developed on coarse textured water-deposited materials. In Prince County they occur dominantly on glaciomarine surficial deposits; elsewhere in the province soil parent materials are dominantly of glaciofluvial origin. In the latter areas the parent materials are strongly acidic but on glaciomarine surficial deposits the materials are less acidic or even weakly alkaline in some areas.

Most of the soils remain in forest. Vegetation consists of maple, willow, cedar, spruce, alder, balsam fir, and tamarack. Ground flora includes broadleaf species, sedge, sphagnum moss, and other mosses. Undisturbed sites have moderately thick peaty organic surface over prominent, light-colored Aeg horizon and stongly mottled Bg horizon. Profiles and parent materials have variable contents of gravel and fine cobble fragments. On the detailed maps textural soil phases are indicated in the map unit symbol: RpI denotes coarse textured material in the upper solum to 50 cm depth; RpJ indicates that the material over this depth is medium textured or finer. The dominant texture of the surface 20 cm is also indicated on the detailed maps.

Use

Virtually no areas of the Rocky Point soils have been improved for agricultural use. A few areas may be suitable but development costs are likely to be high. In general, the soils after drainage are likely to have low moisture-holding capacity unless the water table is adequately controlled to supply crop needs.

SITE DESCRIPTION

Location: N 46° 40' 06" W 64° 03' 11"
Drainage: Very poorly drained; internal: rapidly pervious; site: surface runoff very slow.
Vegetation: Poplar, tamarack, maple, spruce, and alder, with sphagnum moss, cattails, and some reeds.
Topography: Level to depressional; elevation 10 m A.S.L.
Classification: Orthic Gleysol

Horizon	Depth (cm)	Description
Om	10-0	Peaty moderately decomposed organic litter of mixed materials.

Aeg	0-20	Light gray (10YR 7/2m) loamy sand; single grain; many large, distinct yellowish brown mottles over 50% of the surface; porous; loose, nonsticky.
ABg	20-28	Light reddish brown (5YR 6/4m) loamy sand; single grain; strongly mottled; porous; loose, nonsticky; clear, smooth boundary.
Bg	28-62	Reddish brown (2.5YR 4/4m) gravelly loamy sand; single grain or very weak platy; strongly mottled to the water table at 23 cm; porous; loose, slightly sticky; many gravel fragments; clear boundary.
Cg	62+	Reddish brown (2.5YR 4/4m) gravelly sandy loam that becomes more gravelly with depth.

Salt Grass Point map unit

Soils of the Salt Grass Point map unit are not extensive (8700 ha). They have been mapped mainly in Prince County. The unit consists of imperfectly drained soils developed on moderately coarse textured marine sediments or modified non-compact tills. The parent materials are reddish brown and are generally fine, sandy loam, but occasionally they are stratified with coarser materials. Soils with finer textured strata in the 50-100 cm depth were placed with the West Point map unit. On the detailed maps textural soil phases are indicated with the map unit symbol: SpI denotes coarse textures in the upper solum to 50 cm depth; SpJ denotes medium or finer textured material over part or all of this depth. In a few areas the parent materials may be weakly alkaline as a result of the inclusion of localized calcareous breccia conglomerate, or where a high water table prevented leaching or removal. Due to these conditions, the site described below is classified as Gleyed Eluviated Eutric Brunisol; however, similar soils in the Salt Grass Point map unit classified as Gleyed Eluviated Dystric Brunisol may be encountered.

Soil profiles usually have thick, light-colored Aegj horizons over weakly developed Bg horizons low in amorphous accumulations of Fe and Al oxalate. Subsoils and parent materials are usually friable but have a high bulk density and usually a slow permeability. Exchange capacity is low but fully base saturated below 50 cm.

Use

Although some areas of Salt Grass Point soils have been improved for agriculture, few areas have been adequately drained for intensive crop use. Where adequate drainage is possible the soils have some advantages such as relatively high surface organic matter levels and possibly less subsoil compaction. Adequate drainage by tiles or a combination of tile and ditching is expensive and may be difficult to impossible in some areas. Subsoil permeabilities may be too slow to remove by tile the excess water that accumulates in the soil as a result of normal precipitation, slope seepage, or conceivably groundwater upwelling.

SITE DESCRIPTION

Location: N 46° 32' 04" W 64° 03' 33"
Drainage: Imperfectly drained; internal: slowly pervious; site: surface runoff slow.

Vegetation: Pasture field reverting to spruce, tamarack, and alder forest.
Topography: A 2% northeast-facing slope; elevation 9 m A.S.L.
Classification: Gleyed Eluviated Eutric Brunisol.

Horizon	Depth (cm)	Description
Ap	0-15	Very dark grayish brown (10YR 3/2m, 5/2d) fine sandy loam; strong, medium granular and subangular blocky; mottled; friable, slightly sticky; plentiful medium and fine roots; abrupt, smooth boundary.
Aegj	15-23	Yellowish red (5YR 4/6m, 6/4d) fine sandy loam; single grain; loose, nonsticky; common, fine manganese concretions; few medium, distinct mottles; plentiful medium and fine roots; abrupt, wavy boundary.
Bm	23-53	Dark red (2.5YR 3/6m, 5/6d) fine sandy loam; weak, medium platy; very friable, slightly sticky; few medium faint mottles; plentiful fine roots; gradual, smooth boundary.
Ck	53-100	Dark red to reddish brown (2.5YR 3/6m, 5/4d) fine sandy loam; micaceous, non-compact material derived from soft sandstone.

Tignish map unit

Soils of the Tignish map unit cover about 13 600 ha. They are moderately extensive in West Prince County, around Charlottetown, and east to Orwell Cove. Small areas intermingle with soils of the Charlottetown map unit elsewhere in the province. Tignish soils are associated in the landscape with O'Leary (moderately well drained), Duvar (imperfectly drained), and Margate (poorly drained) map units on the same parent materials.

Tignish soils are well drained; they have good surface drainage and upper profile permeability. Below 40 or 50 cm, however, permeability is slow or very slow. The soils have developed on dense, reddish brown loam till. The parent materials are acidic, dominantly ground moraine of local orgin but the map unit also includes soils developed over weathered bedrock material. Where bedrock is encountered it is usually soft sandstone-siltstone, easily removed with light machinery. The contents of clay and silt in the parent material are 8 to 18% clay and 50 to 65% silt plus clay. Parent materials and profiles have very few coarse fragments.

Tignish soils occur dominantly on gently undulating relief but a variety of slopes have been mapped. The soils have developed under a climax vegetation of dominantly hardwood species. Forested areas consist mainly of birch and maple with intermingled spruce, oak, poplar, and other species. Undisturbed sites have strongly developed, hummocky microtopography with cyclic horizon development. Active biological breakdown of forest humus and incorporation of mineral material have produced a dark brown Ah horizon about 2-7 cm thick. The light-colored, leached Ae horizon is variable in thickness and often discontinuous. The soil is classified as Podzolic Gray Luvisol because the upper B horizon readily satisfies current criteria for podzol horizons and the underlying horizon of clay accumulation Bt occurs within 45 cm of the soil surface.

Use

A high percentage of the Tignish soils are cleared and farmed. Potato is a major crop, but the soils are suitable for climatically adapted cultivated crops, grasses, and legumes. Winter damage to legumes is common. The soils are easily worked but during wet springs the soils are late compared to Charlottetown or Alberry soils. Organic matter levels in the usual 40 cm of rooting depth are low and may contribute to soil erosion.

Lime and fertilizer applications are necessary for acceptable productivity of agricultural crops. Base saturation throughout the slow solum is normally below 50% and rises only slightly in parent materials. The predominance of the fineness of pores in subsoil and parent material is indicated by less than 5% coarse pores by volume between saturation and 10 kPa. Bulk density values approach or exceed 1.80 g/cm^3 and hydraulic conductivity values decrease rapdily below 50 cm depth.

SITE DESCRIPTION

Location: N 46° 11' 42" W 62° 56' 35"
Drainage: Well drained; internal: slowly pervious; site: surface runoff rapid.
Vegetation: White birch, yellow birch, sugar maple, and striped maple.
Topography: A 1% southeast-facing slope; gently undulating with strong microtopography; elevation 12 m A.S.L.
Classification: Podzolic Gray Luvisol.

Horizon	Depth (cm)	Description
Ahe	0-10	Reddish brown (5YR 4/3m, 7.5YR 4/2d) loam; very weak platy; very friable; many white sandy grains; abrupt, wavy boundary; 4-12 cm thick.
Ae1	10-18	Reddish brown (5YR 5.5/3m, 7.5YR 7/2d) loam; weak, fine blocky; very friable; clear, irregular boundary.
Ae2	18-28	Reddish brown (5YR 4.5/3m, 5/3.5d) fine, sandy loam; weak platy; friable; abrupt, irregular boundary.
Bf	28-38	Reddish brown (2.5YR 4/5m, 5YR 5/5.5d) loam; moderate, fine angular blocky; very friable; clear, wavy boundary.
Bt1	38-51	Reddish brown (2.5YR 4/5m, 5YR 5/5.5d) loam; moderate, coarse platy to fine blocky; friable; some cutans; gradual boundary.
Bt2	51-70	Reddish brown (2.5YR 4/5m, 5YR 5/6d) loam; moderate, coarse platy; firm, hard; some cutans.
BC1	70-92	Reddish brown (2.5YR 4/5m) loam; amorphous; firm, hard; few MnO_2 mottles; diffuse boundary.
BC2	92-120	Reddish brown (2.5YR 4/5m, 5YR 5/5d) loam; amorphous; firm, very hard; sandstone fragments.

Uigg map unit

Soils of the Uigg map unit are imperfectly drained. The imperfect drainage is the result of runoff or seepage from higher elevation, causing a temporary to prolonged local water table. The soils are developed on reddish brown, strongly acidic, coarse textured glaciofluvial and ablation materials, which frequently include or overlie finer textured glacial till or residual material at variable depth.

The Uigg soils are not extensive (about 6900 ha). Individual delineations occur mainly as small, gently undulating areas in association with Culloden soils. Profiles generally have moderately decomposed organic surface over deeply leached grayish mottled Ae horizons about 15 cm thick. The underlying B horizon contains little colloidal organic matter but soil particles have amorphous sesquixode coatings. The organic matter levels and the exchange capacity and base saturation of the solum are very low.

Use

Few areas of these soils are cleared and cultivated except where they occur as small parts of fields that have better drainage. The soils are only moderately productive for forestry because of soil wetness, acidity, and low fertility levels. Forested sites have maple, spruce, tamarack, aspen, and alder as common species.

SITE DESCRIPTION

Location: N 46° 19' 27" W 62° 34' 14"

Drainage: Imperfectly drained; internal: rapidly pervious; site: medium surface runoff.

Vegetation: Alder, poplar, spruce, tamarack, sedge, lambkill, and mosses.

Topography: Less than 1% south-facing slope; elevation 8 m A.S.L.

Classification: Gleyed Eluviated Dystric Brunisol.

Horizon	Depth (cm)	Description
Apgj	0-12	Dark grayish brown (10YR 4/2m, 6/2d) loamy fine sand; weak, medium and coarse subangular blocky; common, medium distinct mottles; very friable; abrupt, smooth boundary; 10-15 cm thick.
Aegj	12-23	Pale yellow (2.5Y 7/4m, 8/2d) loamy fine sand; loose; single grain; common, medium distinct mottles; clear, smooth boundary; 8-13 cm thick.
ABgj	23-30	Yellowish brown (10YR 5/4m, 5YR 5/4d) loamy fine sand; very weak, medium subangular blocky; common, medium and fine distinct mottles; plentiful roots; clear, smooth boundary.
Bmgj	30-66	Reddish brown (5YR 4/4m, 2.5YR 5/4d) gravelly loamy sand; very weak, medium subangular blocky; common, medium faint mottles; plentiful roots; 24% gravel; 20-50 cm thick.
BC	66-100	Reddish brown (5YR 4/4m) gravelly loamy sand; amorphous; 29% gravel; abrupt boundary.
IIC	100+	Reddish brown (5YR 4/4m) fine sandy loam, ground moraine.

West Point map unit

Soils of the West Point map unit are imperfectly drained; they have moderate to slow surface drainage and slow internal permeability. The soils are developed on medium textured marine material, and on associated non-compact glacial till. Both materials are associated in areas of postglacial overlap (10).

The soils have limited extent (about 4500 ha). They are confined to the coastal fringe area in Prince County below the 22 m contour of elevation, in complex pattern with soils similar in origin but differing in drainage and texture. Soil profiles are acidic but occasionally weakly alkaline parent materials are encountered. The water table is usually within the solum, and the soil surface may remain saturated late into the growing season.

The soils are relatively stone free. Where they are stratified above 50 cm depth, textural phases are indicated in the map symbol on the detailed maps: I indicates textures that are moderately coarse; J indicates textures that are medium or finer. Forested soils have a mixed wood association with a dominance of spruce, fir, and tamarack. Soil profiles of forested sites have thick, moderately decomposed, peaty organic surface over a grayish prominent mottled Ae horizon. The underlying B horizon shows variable mottling, low content of Fe, Al, and colloidal organic material, weak structure, and generally weak development that grades rapidly into unaltered C horizon material.

Use

Few areas have been cleared and drained for agricultural use other than for permanent pasture or production of grass for winter fodder. Adequate drainage to enable use of the soils for cultivated crops requires major inputs. Various problems that may be encountered include complex soil pattern, lack of sufficient gradient and drainage outlets, and slow subsoil permeability or variability over short distances. Cultivated soils require lime, fertilizer, and deep tillage to improve rooting depths.

SITE DESCRIPTION

Location: N 46° 38' 18" W 64° 17' 08"
Drainage: Imperfectly drained; internal: slowly pervious; site: slow to moderate surface runoff.
Vegetation: Mainly timothy, browntop, and clover.
Topography: A 2 to 3% south-facing slope; elevation 8 m A.S.L.
Classification: Gleyed Eluviated Eutric Brunisol.

Horizon	Depth (cm)	Description
Ap	0-17	Reddish brown (5YR 5/4m, 6/4d) loam; moderate to weak, medium blocky; sticky, plastic; many coarse, distinct pinkish gray (5YR 6/2m) mottles; plentiful fine and very fine roots; abrupt, smooth boundary.
Bmgj1	17-30	Reddish brown (5YR 5/4m, 6/4d) loam; weak, medium subangular blocky; sticky, plastic, firm, hard; common, medium, distinct pinkish gray mottles; gradual, smooth boundary; 12-15 cm thick.
Bmgj2	30-60	Red (2.5YR 4/6m, 5/4d) silt loam; weak, medium subangular blocky and medium platy; slightly sticky, plastic, firm, hard; gradual, smooth boundary.
C	60-100	Reddish brown (2.5YR 4/4m, 6/3d) loam to silt loam; amorphous; slightly sticky, plastic, firm, hard.

Winsloe map unit

Soils of the Winsloe map unit occupy 11 379 ha. They are poorly and very poorly drained due to slow surface drainage and slow internal permeability. The water table at or near the soil surface for much of the year contributes to the accumulation of varying thickness of poorly decomposed peaty organic materials on the soil surface. All profiles have a deep light-colored Aeg horizon 10 cm, or more, thick, over a dense mottled B horizon that is relatively structureless or has a weakly to moderately developed platy structure.

The soils are developed on reddish brown moderately coarse textured compact glacial till derived from local sandstone bedrock. The weathered sandstone bedrock may occur within 1 m in depth. The soils are the poorly and very poorly drained associate members of the Charlottetown and Alberry map units. All profiles are strongly acidic.

The topography is depressional to gently undulating. The vegetation consists of poor-quality, slow-growing mixed wood species dominated by black spruce, with tamarack, alder, balsam fir, and red maple. Few areas of the soil have been cleared and drained for agricultural use.

Use

Surface and subsoil wetness, low porosity, and poor physical environment cause plant roots to be confined to the surface part of the profile. Soil drainage is a prime requirement for any soil improvement for plant growth. The soil is acidic and low in fertility. A combination of tile underdrainage and surface ditching could be used in many areas.

SITE DESCRIPTION

Location: N 46° 20' 27" W 62° 36' 07"
Drainage: Poorly drained; internal: slowly pervious; site: very slow surface runoff.
Vegetation: Black spruce, lambkill, blueberry, feather moss, hypnum moss, and sphagnum moss species.
Topography: Less than 1% east-facing slopes; 23 m A.S.L.
Classification: Orthic Gleysol.

Horizon	Depth (cm)	Description
LFH	9-0	L layer 5 cm of slightly decomposed moss and leaf litter: F layer 3 cm; reddish brown (5YR 4/4m) acidic, moderately decomposed organic material; H layer 1 cm thick; dark reddish brown (5YR 3/3m) organic material; greasy and amorphous.
Aeg1	0-13	Very pale brown (10YR 8/3m) fine sandy loam; amorphous; friable, non sticky; few roots; clear, smooth boundary; 10-17 cm thick.
Aeg2	13-24	Pale brown to yellow (10YR 6/3, 7/6d) fine sandy loam; amorphous; friable; few roots; coarse mottles and iron-organic staining; clear, wavy boundary; 6-12 cm thick.

Bg	24-39	Brown (7.5YR 5/4m) fine sandy loam; amorphous; dense; firm; medium, distinct mottles cover 80% of matrix; smooth, diffuse boundary; 6-12 cm thick.
Bmgj	39-76	Reddish brown (2.5YR 4/4m) fine sandy loam; amorphous to weak platy; common, fine manganese mottles; coarse fragment 15% by volume.
C	76+	Reddish brown (2.5YR 4/4m) fine sandy loam compact moraine.

Wolfe Inlet map unit

Soils of the Wolfe Inlet map unit are imperfectly drained; surface soil drainage is moderate to slow and internal profile vertical water transmissibility is slow. The soils are developed on reddish brown moderately fine textured glacial till or residual material. The till materials are dominantly acidic but in a few areas mildly acidic to weakly alkaline. Parent material texture is loam or silt loam with clay content in excess of 18%. Coarse fragment content is low.

The soil has a very small extent (about 600 ha). It occurs on gently undulating slopes in association with Fifteen Point map unit, the moderately well drained member. Forested soils have red maple and white birch intermixed with varying amounts of poplar, spruce, and fir. Undisturbed forest sites have an organic surface composed of forest litter that has been partly incorporated with mineral material to form a mull-like Ah, usually less than 5 cm thick. The underlying light-colored Ae horizon is variable in thickness and ranges in texture from fine sandy loam to silt loam. Faint mottling throughout the Ae horizon and into the upper B horizon indicates wet conditions that persist well into spring. Although Fe and Al have been leached from the A horizon, little has been precipitated into the B horizon. There the main accumulation product has been fine clay, some of which occurs as thin films that coat the few voids in the dense matrix. The B horizon has weak to moderately developed blocky structure that weakens with depth. The bulk density of material in the lower B and C horizons approaches 2.00 g/cm^3.

In cultivated fields the surface soil is usually loam texture. Rooting depth is restricted by the compact subsoil that occurs almost immediately below the plow layer.

Use

The Wolfe Inlet soils have small total area. Their use for agriculture is limited mainly to pasture and grassland production. Legumes and clover are likely to suffer from severe winterkill.

SITE DESCRIPTION

Location: N 46° 53' 43" W 64° 08' 56"
Drainage: Imperfectly drained; internal: slowly pervious; site: surface runoff slow.
Vegetation: Mixed forest, regenerating to red maple, white birch, trembling aspen, ground hemlock, and ferns.
Topography: A 1% northwest-facing slope; elevation 49 m A.S.L.
Classification: Gleyed Gray Luvisol.

Horizon	Depth (cm)	Description
LFH	4-0	Prominent F layer 3 cm thick; dark gray (5YR 4/1m) organic material and mineral grains.
Ahe	0-2	Dark gray (5YR 4/1m) silt loam; moderate, medium, subangular blocky; friable; abrupt, irregular boundary.
Aegj	2-13	Brown (7.5YR 5/4m, 10YR 7/3d) fine sandy loam; common, medium, faint mottles; weak platy breaking to weak, medium granular; friable; irregular, abrupt boundary.
Abgj	13-20	Reddish brown (5YR 4/4m, 6/3d) fine sandy loam; medium, faint mottles; weak platy breaking to medium, subangular blocky; sticky, friable, slightly plastic; plentiful fine roots; abrupt, irregular boundary.
Bt	20-30	Reddish brown (2.5YR 4/4m, 5/6d) loam; moderate, coarse, prismatic breaking to moderate, coarse, angular blocky; sticky, plastic; common, thin clay films; diffuse boundary.
Btgj	30-56	Reddish brown (2.5YR 4/4m) silty clay; common, manganese skins on ped surfaces; strong; coarse, angular blocky; plastic; friable; many fine, continuous pores; common, thin clay films; smooth, clear boundary.
BCk	56-78	Reddish brown (2.5YR 4/4m, 5/4d) silty clay; moderate effervescence; sticky, plastic, firm consistence.
IICk	78+	Reddish brown (2.5YR 4/4m, 5/4d) silt loam residual material; strong effervescence.

Wood Island map unit

Soils of the Wood Island map unit have very limited extent (about 2000 ha). They occur in association with Culloden and Kildare map units, mainly near coastal areas. The soils are poorly drained; they have slow surface drainage but rapid profile permeability above alternating water table. The water table is near the soil surface for much of the year but below 35 to 50 cm by the middle of the growing season.

The soils are developed on coarse and moderately coarse textured glaciofluvial deposits. The parent material and profile is strongly acidic. In undisturbed sites the soil has a thick peaty organic surface overlying a mottled grayish Aegj horizon 15 to 25 cm thick that is strongly infiltrated with blackish organic materials in the lower portion. The underlying Bhgj horizon is dark reddish brown, stong platy in places, and more than 10 cm thick underlain by a weakly to strongly cemented Bfc horizon.

The present forest vegetation consists of mixed wood species, often burned-over areas of aspen, tamarack, spruce, birch, fir, and alder, with an understory of lambkill, rhodora, sphagnum moss, and other mosses and plants.

Use

Few of the soils have been cleared for agricultural use. Most areas are small and improvement costs would be high. The suitability of the soils for crops after drainage is severely limited by the low moisture holding capacity of the rather coarse textured surface soil.

SITE DESCRIPTION

Location: N 46° 40' 00" W 64° 00' 20"

Drainage: Poorly drained; surface runoff slow; water table at 110 cm in July but near the surface for most of the year.

Vegetation: Spruce, tamarack, alder, poplar, lambkill, rhodora, and sphagnum moss species; area previously burned over.

Topography: Nearly level; elevation 8 m A.S.L.

Classification: Ortstein Humic Podzol (see note).

Horizon	Depth (cm)	Description
Om	5-0	Dark gray (5YR 4/1m) moderately decomposed peaty organic layer.
Aeg	0-10	Light brownish gray (10YR 6/2m, 6/1d) loamy fine sand; common, medium, faint mottles; single grain; friable, nonsticky; plentiful fine and medium roots; clear, wavy boundary.
Aeg2	10-15	Dark brown (7.5YR 3/2m, 4/2d) loamy fine sand; weak, fine platy; common, medium, faint mottles; friable, slightly sticky; plentiful medium and fine roots; abrupt, smooth boundary.
Bhgj	15-25	Dark reddish brown (5YR 2/2m, 3/3d) loamy fine sand; common, medium, faint mottles; moderate, fine and medium platy; friable; peds weakly cemented; abrupt, smooth boundary.
Bfjc	25-43	Dark reddish brown (5YR 3/3m, 7.5YR 4/4d) fine sand; weak, medium platy; few coarse, faint mottles; few roots; weakly to moderately cemented; abrupt, wavy boundary.
BCgj	43-58	Red (2.5YR 4/6m, 5/5d) loamy fine sand; single grain; friable; common, medium, faint mottles.
C1	58-72	Weak red (10YR 4/4m, 5/4d) sandy loam; modified glacial till; 8% gravel.
C2	72-152	Similar to above horizon with 14% coarse fragments.

Note: The Bh horizon of the Wood Island series has been used by several research scientists to isolate and describe the fulvic acidic fraction from the organic material of the Bh horizon. In most of those research papers the soil was referred to as Armadale, a complex of poorly drained soils in the original reconnaissance soil survey of Prince Edward Island. The Armadale name has been discontinued and the soil that contains the Bh horizon is the Wood Island series, the Ortstein Humic Podzol described above.

DESCRIPTION OF MISCELLANEOUS LAND TYPES

The map units grouped here as miscellaneous land types have not been surveyed in detail nor have their profiles been described. They were identified either by photo interpretation or by location and landform during field work and examined by site profile only infrequently.

Coastal Beach map unit

This map unit identifies areas along the coastline where sand, gravel, and other coarse fragments have been deposited and reworked by waves. The unit includes backshore areas of actively eroding sea cliffs.

The northern coastline and parts of the western and eastern coastline are exposed to the open water of the Gulf of St. Lawrence. Storm waves and longshore currents shape or continously build up and destroy temporary shore features. These include baymouth bars, barrier bars, spits, tombolas, intertidal beaches, and other prominent features that reshape the exposed coastlines. The copious supply of sand is reworked from headland erosion of glaciofluvial deposits, glacial till, and the soft sandstone bedrock. In contrast, the Northumberland Strait coastline is more protected and has retained its irregular pattern.

Use

The intertidal beach forms are undifferentiated in terms of quality, but they include many excellent beaches for recreational use. Conservation and protection for this purpose is important, but in some areas limited removal of gravel, sand, and coarser fragments is allowed.

Dune Sand map unit

This map unit consists of dune sand landform. The grayish to yellowish brown sand is blown from the drier portions of beaches by onshore winds and shaped into dunes, which become stabilized with the aid of plants that have adapted to the area. The dunes form narrow bands up to 10 m high, most commonly along the north shore, but small areas also exist along the coast in other parts of the province. Although they are subjected to reworking and erosion by wind, they have not migrated inland appreciably. The deposits have not yet developed soil horizons, although older, more stabilized areas have some organic matter and darker color in the upper few centimetres of surface material. Adjacent soils usually have thin surface deposits of drift sand or intermixed material.

Dune vegetation includes marram grass, which is the most common grass on the upper beach area and foredune, bayberry, and a few other grass species that are able to survive, for short periods at least, in such a hostile environment for plants. Common plant species on older dunes include poverty grass, bearberry, and reindeer mosses. Wet depressions may have the large cranberry, sheep laurel, or dense stands of scrub spruce, stunted and oddly shaped by exposure to strong wind and salt spray.

Use

The map unit has no present or potential use for agriculture. It is a fragile ecosystem that requires protection and conservation measures to preserve its natural beauty and uniqueness for present and future generations.

Stream Complex map unit

As the name implies, this map unit consists of soils developed on recent water-deposited material along stream channels. Individual areas are small, dominantly poorly drained, coarse to medium textured Rego Gleysols. Areas outlined on the detailed maps include eroding slopes and organic soils within the complex too small to map separately.

Use

Few areas of the soils have been improved for agricultural use but isolated areas have some suitability for pasture. Forest vegetation consists of alder, black spruce, tamarack, and shrubs.

Airport, cemetery land, steep land, and pit map units

Areas shown as these map units are delineations of unsurveyed land. Pits are non-soil units where gravel Pg or other mineral material Pb has been excavated. Steep land has slopes in excess of 30%.

Salt Marsh map unit

This map unit has very limited extent (about 8000 ha). Within the unit no differentiation has been made in terms of texture of the sediments, amount and degree of decompositon of included organic layers, soil depth, or other profile characteristics.

The Salt Marsh map unit is found on salt water marshes or tidal marshes. Salt water marshes are nearly flat landscape units located, usually, in well-protected topographic positions that are periodically flooded by sea water. Freshwater sedge grows just above the high tide and progessively migrates to higher land as the sea encroaches or rises. Sand, silt, and clay accumulate with the decomposing plant material in protected basins, allowing salt-tolerant plants to grow. The major marsh type in Prince Edward Island is estuarine in origin. In other marsh types, beach lagoons are progressively filled with sand washed or blown from the beaches during storms. The vegetation on these marshes is mainly reeds and sedges intolerant of strong salt conditions.

On marshes where salinity is greatest the vegetation consists of saltwater cordgrass, spick grass, saltwort, and other species. Higher drier areas have switch grass and sea myrtle. Less salty estuarine marshes include cattails, reeds, and bulrushes, as common species.

Use

Most deposits in Prince Edward Island are small and shallow but variable in depth from place to place. Because of their very limited extent, poor drainage, and profile variation they have low present or future potential use for agriculture. They serve as habitats for wildfowl. A few dyked areas are not unused but small areas may be cut for marsh hay or grazed for pasture.

LAND USE

This section deals with interpretations and evaluations of soil for various uses: present land use and interpretations of soils for agriculture and forestry, engineering evaluations of soils, and interpretations of soils for community development. Most interpretations are expressed in degrees of limitation and apply to soils in their natural state.

Four degrees of limitation are expressed:

Slight (Sl) - Soil areas having few or no limitations that are easily overcome.
Moderate (M) - Soil areas having few limitations of a moderate severity that can be overcome with moderate management levels; input costs need to be carefully assessed.
Severe (S) - Soil areas having one or more limitations so severe as to make use questionable because of costs or continuing problems expected with use.
Unsuitable (U) - Soil areas having one or more limitations that make them unsuitable because inputs required are too great under existing conditions.

Guidelines are included for the generalized uses, showing the soil properties considered in establishing degrees and kinds of limitations. In preparing the limitation tables the degree is determined by the most restrictive or severe rating assigned to any one of the listed soil properties. The major soil properties do not have equal effect, each is considered separately in establishing the class limits. A severe rating of one soil property establishes the overall rating of severe for the soil use. Also, limitations have an accumulative effect. If several soil properties are rated as moderate then the overall rating is downgraded to severe.

The ratings for each use are based solely on landscape criteria and the following should be considered.

(1) Interpretations do not eliminate the need for on-site evaluations. The need for such studies may depend on many factors that relate to use, impact, and management.
(2) The level of survey detail, accuracy, limits of the soil map, and purity of map unit components should be understood in assessing information about any area.
(3) Socioeconomic factors are ignored. The size, shape, location, or aesthetic values of soil areas are not taken into consideration.

Present land use

Acadian-French farmers established the first permanent settlements in Prince Edward Island about 1720. Since that time the proportions of forest and cleared agricultural land have been changing continually. Land cleared and improved for agriculture expanded to a maximum of 311 260 ha by 1911. This represented 54% of the total land area and was the highest percentage for any province in Canada. It has since decreased steadily except for a slight increase over the past few years. The census figure for improved agricultural land is 202 688 ha for 1981, which represents only 35% of the total land area. Much of the land less suited for agricultural crops, such as land with adverse topography, excess wetness, or somewhat droughty soils, has been allowed to revert to forest. In addition, all soils in the province require high applications of lime and fertilizer for acceptable productivity. This reason alone places Atlantic-area farmers at a competitive disadvantage compared with farmers in central and western Canada. Although the physical attributes of the land base for commercial agriculture have had a significant effect in the decrease in improved land, they do not explain the whole story; major causes lie elsewhere.

Tables 9 and 10 indicate that since about 1950, there has been a steady decrease in the number of farms but an increase in farm size and area of improved land per farm. This trend to fewer and larger farm units that are more suited to mechanized and specialized production is likely to continue. The number of farm tractors increased from 2776 in 1951 to 4840 by 1956 and to 5865 by 1971. Similar increases occurred in potato-harvesting equipment, grain combines, and other heavy machinery. In 1951 the total farm population was 46855. The farm population decreased rapidly to 21 388 in 1971, although farm cash receipts increased from $18 million to $39 million in 1971 and to $210 million in 1981.

The agricultural economy on the island is of a generalized nature. Although there is an increasing number of farms with large potato hectarages, and a few operators specializing in large-scale poultry, hog, or horticultural crop production, most farms follow a mixed farm operation. In 1981 about 35% of all farm operations in Prince Edward Island were part-time farms. Livestock products are the chief source of farm income, and potato, both seed and table stock, is the main cash crop. Although the potato crop area has remained reasonably uniform, there have been large increases in yields and improvements in quality. Aside from potato the main crops grown are those needed for livestock feed. Most of these crops have been significantly increased in the past 5 years.

The production of tree fruits, small fruits, and vegetables has been low since 1930 but there have been some increases in the past decade. Lowbush blueberry, particularly, seems to have long-term potential for expanded production. There is a relatively large base of suitable soils that provide some advantages and few disadvantages to island producers as compared to producers outside the province.

Tobacco was grown in the province for the first time in 1959, and by 1981 the land allotted to this crop had been increased to 1600 ha.

Approximately half the island is covered by woodland or forest. The distribution pattern is dictated mainly by the degree of suitability of the land for agricultural use. In better or more concentrated farming areas, mainly in the central part of the province, isolated small woodlots are common. Larger blocks of forested land occur in the western and eastern sections of the island mainly on poorly drained land, on steeply sloping hill land, and on relatively large expanses of Culloden, Dunstaffnage, and some Alberry soil where droughtiness is a problem for certain agricultural crops.

Original forests (4) were characterized by northern hardwoods that predominated on the well-drained sites. Sugar maple, beech, and yellow birch were the dominant species. White pine and hemlock occupied the excessively drained sites, whereas the species on poorly drained soils were probably very similar to that of today.

Table 9. Hectares of land under various uses, and the number and size of farms in representative years 1931 to 1981

	1931	1951	1971	1981
Total	565 654	565 654	566 172	575 253
In farms	482 063	443 254	313 482	283 024
Improved land	309 897	261 344	199 968	202 688
Under crops	201 175	172 481	142 200	158 280
Under pasture	98 013	80 102	46 244	36 288
Other improved land	10 304	8 761		8 180
Unimproved land	172 165	181 910	113 514	80 336
Woodland	137 219	140 099	85 353	65 436
Other	34 946	41 811	26 543	14 899
Total number of farms	12 685	10 137	4 543	3 154
Average size	39.1	43.7	68.9	89.7
Land improved per farm	24.1	25.8	44.0	64.3

Source: Census of Canada, Agriculture.

Table 10. Number of farms of various sizes in representative years 1931 to 1981

Basis to 1971				Basis 1971 and 1981		
Size (ha)	1931	1951	1971	Size (ha)	1971	1981
0.40- 1.62	333	52	55	< 1.21	33	77
2.02- 4.05	357	183	45	1.21- 3.64	58	72
4.05- 20.23	3 052	1 879	408	4.05- 27.92	660	423
20.64- 40.47	5 071	3 806	1 158	28.33- 52.20	1 447	735
40.87- 80.94	3 418	3 447	1 733	52.61- 72.44	835	457
81.34-121.00	488	576	611	72.84- 96.72	653	414
121.41-193.84	131	172	385	97.12-161.47	611	577
194.25-258.59	12	18	81	161.87-226.22	145	217
259.00+	3	4	67	226.62-307.16	62	87
				307.56-452.84	19	57
				453.25-647.09	12	24
				647.5+	8	14
Total	12 865	10 137	4 543		4 543	3 154

Source: Census of Canada, Agriculture.

Table 11. Number of livestock in representative years 1931 to 1981

Kind	1931	1951	1971	1981
Horses	100 487	21 349	2 941	2 317
Cows (2 years and over) for milk	44 580	38 909	28 174	24 106
All other cattle	55 907	59 015	77 888	78 347
Sheep	78 478	34 386	8 484	7 619
Pigs	40 586	72 499	100 936	116 843
Hens and chickens	873 949	978 019	268 642	222 729
Other poultry	52 118	51 676	9 314	10 680

Source: Census of Canada, Agriculture.

Table 12. Hectares under main crops in representative years 1931 to 1981

Crop	1931	1951	1971	1981
Wheat	8 107	1 923	2 675	3 289
Oats	60 203	40 639	20 361	13 406
Barley	1 528	1 644	13 004	21 544
Mixed grains	8 423	29 026	28 898	34 215
Hay, cultivated	95 109	82 467	51 965	50 081
Fodder, other than oats	-	-	554	917
Potato	-	-	18 920	25 851
Corn for silage	113	287	1 092	2 555
Tobacco	-	-	1 317	1 626
Rye for grain	-	36	66	981
Vegetable	28	172	1 450	1 668
Tree fruits	919	123	68	50
Small fruits	13	124	277	408

Source: Census of Canada, Agriculture.

Table 13. Forest inventory, volume, and biomass summary for Prince Edward Island, 1981

Cover type	Hectares	Volume (C/M)	Biomass (DT)
Softwood	90 229	11 807 600	15 902 800
Softwood/hardwood	33 257	4 398 450	5 073 970
Hardwood/softwood	52 803	7 160 050	8 220 410
Hardwood	70 447	9 982 100	11 765 300
Total high forest	246 736	33 348 200	40 962 480
Other forest land			
Forest alder	10 320		
Alder (old field)	7 018		
Plantation	448		
Windfall	85		
Disease/insect-killed	150		
Clear-cut	13 101		
Burn	974		
Total forest land	278 832		
Non Forest Land			
Agriculture	231 486		
Bog	5 775		
Urban	11 393		
Gravel pit	1 428		
Railway	1 098		
Recreation land	1 530		
Roadway	8 218		
Sand dune	1 975		
Swamp	7 408		
Cleared land/potential forest	17 988		
Total non forest	288 299		
Water	10 006		

*Prepared for the Prince Edward Island Department of Agriculture and Forestry by Dendron Resource Services Ltd., 1982.

Table 13 gives a volume and biomass summary of a recent forest inventory. The inventory was based on aerial photographs taken in 1980 and on field work done in 1981. The dominant softwood species are spruce and balsam fir and the dominant hardwood species are maple and white birch. Spruce, balsam fir, and to a lesser extent tamarack, make up over 90% of the merchantable softwood timber, along with maple and white birch for the hardwood species. The inventory survey gives the total timber volume as 33 327 000 m^3 and the merchantable volume as 20 993 855 m^3.

Interpretation of soils for agriculture

Interpretation of soil survey data for agriculture consists of (a) Soil Capability Classification, a nationwide system developed for the Canada Land Inventory (CLI) (2); (b) an extension of the CLI system for vegetable and field crops based on guideline criteria (Tables 15 and 16); and (c) interpretations of Classes 2, 3, and 4 soils for some specific crops based on similar guideline criteria. The ratings are not based on yield data but are best judgments subject to change.

The mineral soils are divided into seven classes according to increasing limitations for agricultural use. Classes 1, 2, and 3 are considered capable of sustained production of common field crops, and Class 4 is considered marginal for this use. Soils in Class 5 are capable of use only for permanent pasture and hay. Class 6 soils are capable of use for wild pasture only. Class 7 soils are considered incapable of use for arable culture or permanent pasture or grazing. Tree fruits, and blueberry, cranberry, and ornamental plants are excluded from this interpretation. They are not considered as cultivated or common field crops.

The class is a grouping of subclasses with the same relative degree of limitation or hazard but differing in kind. As such, a subclass is an expression of the major kind of limitation or hazard. Climatic, soil, and landscape limitations are included, but for this province climate is assumed to be sufficiently similar so that conditions such as frost pockets, areas of salt spray, or excessive wind exposure have not been listed or otherwise identified. Soil subclass limitations include (F) low fertility; (M) inadequate soil moisture-holding capacity; and (D) poor structure and permeability. Landscape subclass limitations include (T) unfavorable topography; (P) excess stoniness; (R) shallowness to bedrock; (I) inundation or flooding; (W) excess water, excluding inundation; and (X) cumulative minor adverse characteristics.

The classification makes various assumptions and for placement of island soils (Table 14) the system has been slightly modified, as explained under (1) in the following list of assumptions:

(1) Soils are classified according to existing limitations except that shrubs, trees, stumps, or clearing and leveling costs are not considered as limitations to use. For example, all poorly drained soils are placed in Class 7 regardless of capability after drainage. Where drainage has been improved the soils are normally upgraded one or more classes.

(2) Good soil management practices under a largely mechanized system of agriculture is assumed.

(3) Groupings can be changed by new information or by soil improvements that permanently change limitations.
(4) Distance to markets, size and location of farms, skill of operators, cultural patterns, and so forth are not criteria of classification.

Soil capability Class 1

Soils in this class have no important limitations for crops. They are level or have very gentle slopes; they are deep, well drained, and have good water-holding capacity. They are easily maintained in good tilth and productivity, and damage from erosion is slight. They are moderately high to high in productivity for a wide range of field crops adapted to the region. There are no soils in Prince Edward Island that meet all these requirements. All soils of the province have low natural fertility and for this reason none are included in this class.

Soil capability Class 2

Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.

The limitations of soils in this class may be one of the following: adverse regional climate; moderate effects of erosion; poor soil structure or permeability; low fertility that can be corrected with moderate applications of fertilizer and lime; gentle to moderate slopes; occasional damaging inundation; wetness that can be reduced by drainage but continues as a limitation; and moderate effects of cumulative undesirable characteristics.

These are the better soils on the island, the ones most acceptable for intensive crop production. Along with Class 3 soils they are the resource base for the agricultural industry. Within the industry a major soil management problem is the need for a program aimed at controlling erosion. The long-term viability of the industry depends on measures that can be taken now within the industry to minimize the accelerated erosion that occurs from soils left unprotected over winter. Erosion removes almost selectively the most valuable of soil components; organic matter, soil structure, water-holding capacity, soil nutrients, and exchange capacity or the ability of the soil to store soil nutrients. The problem has been documented reasonably well and technology for control is known. Control methods must be instituted at the farm level, and to be acceptable and reasonable the best insurance is that these methods are voluntary. To date, such controls have generally received low priority, partly because yields and quality of products have been maintained by improvements in other aspects of the production system. However, left uncontrolled, erosion will accelerate and eventually result in many fields and farms being virtually unsuitable for cultivated crop production.

One may logically ask why erosion subclasses have not been indicated in the CLI rating of island soils. Subclass E erosion damage is defined in the CLI system as past erosion damage that limits agricultural use of the land. There are major problems in attempting to map the past erosion pattern. The problem is common to all soils on the island, or in other words, the pattern of occurrence has minimal relationship to kind of material or soil series. Accurate field identification of erosion classes is difficult, time-consuming, and costly; the pattern of occurrence is highly correlated with vegetative cover, past land use, and topography. The cartographic representation of past erosion would be of limited and questionable value. It is the degree and level of current erosion that must be controlled. Control must be exercised at the points of origin or at the source. The topsoil must be kept in place on individual farms or other land use units.

Soil capability Class 3

Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices. The soils have more severe limitations than those in Class 2 and conservation practices are more difficult to apply and maintain.

In Class 3 the limitations are a combination of any two of those described under Class 2 or one of the following: moderate climatic limitations, including frost pockets; moderately severe effects of erosion; intractable soil mass or very slow permeability; low fertility that can be corrected with consistent or heavy applications of fertilizer and lime; moderate to strong slopes; inundation; poor drainage, resulting in crop failure in some years; low water-holding capacity; stoniness sufficiently severe to be a serious hindrance to cultivation and requiring some clearing; and restricted rooting zone.

Soils placed in Class 3 include three fairly distinct groups or subclasses.

(1) Subclass 3FM: The main limitation of these soils in addition to infertility is lower than desirable moisture-holding capacity. Under good management, yields of many crops are equivalent to Class 2 soils, but it is more difficult to maintain Subclass 3FM soils in good tilth and they are less well suited to grassland.
(2) Subclass 3DW: These include the moderately well drained soils and phases of soils. Their main limitation is slow permeability, which delays spring seeding, fall harvest, or cultivation after rains. The soils are well suited for grassland.
(3) Subclass 3T: These are soils whose main limitation in addition to those of Class 2 consists of moderate to strong slopes (5 to 9%). Erosion problems discussed under Class 2 soils apply to all Class 3 soils and become more severe for Subclass 3T.

Soil capability Class 4

Soils in this class have severe limitations that restrict the range of crops or require special conservation practices, or both. They are suitable for only a few crops, or the yield is low for a range of crops, or the risk of failure is high. Although low to medium in productivity for a narrow range of crops, the soils may have as high a productivity for a specially adapted crop as Class 2 or 3 soils.

The limitations include the adverse effects of a combination of two of those in Class 3 or one of the following: moderately severe climate; very low water-holding capacity; low fertility that is difficult or not economic to correct; strong slopes; severe past erosion; very intractable soil mass or extremely slow permeability; severe inundation or wetness with severe effect on crops; extreme stoniness; and restricted rooting depth.

In Prince Edward Island these soils include four fairly distinct groups:

(1) Subclasses 4W, 4WD: These are imperfectly drained soils. They have either slow permeabilities or high water tables. Soils with slow permeability D subclass are difficult to drain.
(2) Subclasses 4M, 4MT: These soils have rapid permeabilities and low moisture-holding capacity. They are early soils, difficult to maintain in good tilth, and may require irrigation if used intensively.
(3) Subclasses 4R, 4RT: These are shallow soils over bedrock that may be shattered or relatively soft sandstone and shale. They have restricted rooting depth and may be droughty.
(4) Subclass 4T: These are soils on relatively steep slopes.

Soil capability Class 5

Soils in this class are capable of producing mainly perennial forage crops but improvement practices are feasible. Because of soil or landscape limitations the soils are not capable of sustained production of annual field crops. Feasible improvement practices include clearing, cultivation, fertilizing, and water control.

The limitations include one or more of the following: severe climate; low water-holding capacity; serious past erosion; steep slopes; very poor drainage; very frequent inundation; severe salinity; and stoniness or shallowness to bedrock that makes cultivation difficult or impractical.

Prince Edward Island soils in Class 5 are limited mainly by steep slopes or other cumulative factors such as droughtiness or shallowness.

Soil capability Class 6

Soils in the class are capable of producing only natural grazing or perennial forage crops, and improvement practices are not feasible. In Prince Edward Island there are no significant areas of Class 6 soils.

Soil capability Class 7

Soils in the class have little or no capability for arable culture or permanent pasture or grazing without major improvements that permanently change soil limitations. Most poor and very poorly drained island soils have been placed in this class. Although improvements are feasible, they must be considered at the community level. Most of these soils are forested. The few areas that are cleared and have slightly improved drainage are Class 5, even though they may not be indicated as such. Soils with very slow permeabilities and poor drainage are indicated 7WD.

Organic soils

In this report organic soils are shown as Class O, meaning they have not been classified for agriculture. At present none of these soils have been utilized for crops in Prince Edward Island; high investments of capital and labor would be required to make them productive, that is, major reclamation. The Arlington and Pownal map units would be the least difficult to develop but methods and costs need to be carefully assessed for each area considered for development. Interpretations for organic soils are discussed elsewhere in this report.

Table 14. Soil capability classes, and their extent and limitations for vegetable and field crops

Map unit name	Map symbol	Slope phase	Capability classification[1]	Limitations for crops[2]		Area (ha)
				Vegetable	Field	
Capability Class 2 soils						
Alberry	Al	B	2F	S1	S1	4 309
		C	2F	M	S1	57 423
Charlottetown	Ch	B	2FD	S1	S1	15 277
		C	2FD	M	S1	115 110
Dunblane	Db	B	2FD	S1	S1	1 284
		C	2FD	M	S1	367
Haliburton	Ha	B	2F	S1	S1	3 155
		C	2F	M	S1	3 044
Newton	Ne	B	2FD	S1	S1	3
		C	2FD	M	S1	136
Tignish	Ti	B	2FD	S1	S1	3 258
		C	2FD	M	S1	7 090
				Total Class 2 soils		210 456
				Percentage of land area		36.7
Capability Class 3 soils						
Alberry	Al	D	3T	S	M	20 839
Charlottetown	Ch	D	3T	S	M	34 437
Culloden	Cu	B	3FM	M	M	531
		C	3FM	M	M	35 212
		D	3TM	S	M	9 280
Dunblane	Db	D	3T	S	M	52
Fifteen Point	Fp	B	3D	M	M	38
		C	3D	M	M	706
		D	3T	S	M	45
Gowanbrae	Go	B	3FM	M	M	160
		C	3FM	M	M	2 381
		D	3TM	S	M	480
Haliburton	Ha	D	3T	S	M	575
Haliburton Brook	Hab	B;C	3W	M	M	1 756
		D	3TW	S	M	56
Kildare	Ki	B	3FM	M	M	3 209
		C	3FM	M	M	2 939
		D	3TM	S	M	345
Newton	Ne	D	3T	S	M	28
O'Leary	Ol	B	3DW	S	M	4 838
		C	3DW	S	M	5 073
		D	3TW	S	M	803
Tignish	Ti	D	3T	S	M	2 077
				Total Class 3 soils		125 860
				Percentage of land area		21.9

Table 14. Soil capability classes, and their extent and limitations for vegetable and field crops (continued)

Map unit name	Map symbol	Slope phase	Capability classification[1]	Limitations for crops[2]		Area (ha)
				Vegetable	Field	
Capability Class 4 soils						
Alberry	Al	E	4T	S	S	12 472
Brackley	Br	B;C;D	4WD	S-U	S	1 176
Bunbury	Bu	B	4M	S	S	12
		C	4M	S	S	163
Carey Point	Cp	B;C;D	4W	S-U	S	1 475
Charlottetown	Ch	E	4T	S	S	17 729
Crapaud	Cr	B;C;D	4W	S-U	S	4 051
Culloden	Cu	E	4MT	U	S	9 558
Dunstaffnage	Df	B;C	4M	S	S	1 004
Duvar	Du	B;C;D	4WD	U	S	8 273
Emyvale	Em	B;C	4R	S	S	134
		D	4RT	S-U	S	34
Fifteen Point	Fp	E	4T	S	S	13
Gowanbrae	Go	E	4TM	U	S	340
Haliburton	Ha	E	4T	S	S	305
Hebron	He	C;D	4WD	S-U	S	97
Malpeque	Ma	B;C;D	4WD	S-U	S	17 770
Munn Road	Mr	B;C;D	4WD	S-U	S	569
Newton	Ne	E	4T	S	S	9
O'Leary	Ol	E	4T	S	S	544
Salt Grass Point	Sp	B;C;D	4W	S-U	S	8 699
Tignish	Ti	E	4T	S	S	971
Uigg	Ui	B;C;D	4W	S-U	S	6 879
West Point	Wp	B;C;D	4WD	S-U	S	4 525
Wolfe Inlet	Wf	B;C;D	4WD	S-U	S	592
				Total Class 4 soils		97 394
				Percentage of land area		17.0
Capability Class 5 soils						
Alberry	Al	F	5T	U	U	4 147
Bunbury	Bu	D;E	5MT	S-U	S	26
Charlottetown	Ch	F	5T	U	U	5 356
Dunstaffnage	Df	D;E	5TM	U	S-U	1 448
Emyvale	Em	E	5RT	U	S-U	74
Haliburton	Ha	F	5T	U	U	108
Kildare	Ki	E	5TM	S-U	S-U	290
O'Leary	Ol	F	5T	U	U	42
Tignish	Ti	F	5T	U	U	296
				Total Class 5 soils		11 787
				Percentage of land area		2.1

Table 14. Soil capability classes, and their extent and limitations for vegetable and field crops (continued)

Map unit name	Map symbol	Slope phase	Capability classification[1]	Limitations for crops[2]		Area (ha)
				Vegetable	Field	
Capability Class 7 soils						
Alberry	Al	G	7T	U	U	121
Baptist Point	Bp	B;C	7WD	U	U	11 625
Charlottetown	Ch	G	7T	U	U	352
Culloden	Cu	F;G	7T	U	U	3 234
Dunstaffnage	Df	F;G	7T	U	U	262
Egmont	Eg	B;C;D	7WD	U	U	965
Emyvale	Em	F;G	7T	U	U	56
Gowanbrae	Go	F;G	7T	U	U	54
Kildare	Ki	F;G	7T	U	U	24
Locke Road	Lr	B;C;D	7WD	U	U	49
Margate	Mg	B;C;D	7WD	U	U	24 590
Mossy Point	Mp	B;C;D	7W	U	U	14 519
Orwell	Or	B;C;D	7W	U	U	7 794
Rocky Point	Rp	B;C;D	7W	U	U	8 987
Tignish	Ti	G	7T	U	U	6
Winsloe	Wn	B;C;D	7WD	U	U	11 379
Wood Island	Wi	B;C;D	7W	U	U	2 081
				Total Class 7 soils		86 098
				Percentage of land area		15.0
Organic soils						
Abney Road	Ab		O	U	U	576
Arlington	Ar		O	U	U	972
Canavoy	Ca		O	U	U	117
Enmore	En		O	U	U	96
Frenchfort	Fr		O	U	U	378
Hazelbrook	Hz		O	U	U	150
Lake Verde	Ve		O	U	U	669
Pisquid	Pi		O	U	U	420
Pownal	Po		O	U	U	2 959
				Total organic soils		6 337
				Percentage of land area		1.1
Other units						
Airport	Ai		N.C.[3]			711
Cemetery Land	Ce		N.C.			68
Coastal Beach	Cb		N.C.			9 466
Dune Sand	Ds		N.C.			2 338
Pit Borrow	Pb		N.C.			1 346
Pit Gravel	Pg		N.C.			361

Table 14. Soil capability classes, and their extent and limitations for vegetable and field crops (concluded)

Map unit name	Map symbol	Slope phase	Capability classification[1]	Limitations for crops[2]		Area (ha)
				Vegetable	Field	
Steep Land	St		7T	U	U	145
Stream Complex	Sc		N.C.	U	U	12 971
Salt Marsh	Sm		N.C.	U	U	8 187
				Total other units		35 593
				Percentage of land area		6.2
				Land area		573 525
				Ponds and lakes		1 398
				Total area		574 923

[1] First capital letter indicates a major limitation, second capital letter indicates a lesser limitation.

[2] Sl = slight, or none; M = moderate; S = severe; U = unsuitable.

[3] Not classified.

Note: For this interpretation vegetable crops include potato, turnip, rutabaga, and other row crops, whereas field crops include cereal, corn, pea, and bean. Soil phases shown on detailed maps are included in the slope phase in which they fall. This includes 21 880 ha of Ch D, 13 974 ha of Al D, and 6220 ha of Cu D, which are hatchured on the soil map.

Table 15. Soil limitations for vegetable crops[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Depth to compact layer (m)	greater than 1.0	1.0-0.5	less than 0.5, greater than 0.3
Permeability (subsoil) (cm/h)	greater than 0.5	less than 0.5, greater than 0.1	less than 0.1
Flooding	occasional flooding	frequent flooding, some crop damage	frequent flooding, severe crop damage
Available moisture capacity[2] (cm)	greater than 10; no need for irrigation	10-6; may need irrigation in some years	less than 6; irrigation is necessary for successful crops
Surface coarse fragments (%)			
(a) Gravel	less than 5	5-35	35-50
(b) Cobbles	less than 2	2-15	15-30
(c) Stones	not a factor in soils of the province		
Depth to bedrock (m)	greater than 1.0	1.0-0.5	less than 0.5, greater than 0.3
Slope (%)	0-2	2-5	5-12
Soil drainage class	well and moderately well drained	rapidly and imperfectly drained	poorly drained
Surface texture	loam, silt loam, sandy loam	loamy sand	silty clay, clay, clay loam, silty clay loam, sandy clay loam, sand

A fourth degree of soil limitation is also defined for vegetable crops:

Unsuitable:
- Less than 0.3 m to compact layer
- Flood risk throughout much of growing season
- Greater than 50% gravel in surface layer
- Greater than 30% cobbles in surface layer
- Less than 0.3 m to bedrock
- Slopes greater than 12%
- Soils with very poor drainage
- Severe droughtiness

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[1] Based on (1) Soil Capability Classification for Agriculture, The Canada Land Inventory, Report No. 2, 1965; and (2) Rose, R.D., et al. 1969. Use of Soils in the Fourteen-County Appalachia Region of New York State. Agronomy Mimeo 69-5, Department of Agronomy, Cornell University.

[2] Class limits are based on the amount of moisture in the surface 50 cm of soil. The class available moisture capacities are related to rainfall and evapotranspiration rates and plant requirements.

Table 16. Soil limitations for field crops [1], [2] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Depth to compact layer (m)	greater than 0.75	0.75-0.40	less than 0.40
Permeability (at 50 cm depth) (cm/h)	greater than 0.5 (moderately slow or faster)	less than 0.5 greater than 0.1 (very slow)	less than 0.1 (extremely slow)
Flooding	occasional flooding, no crop damage	frequent flooding, some crop damage	frequent flooding, severe crop damage
Available moisture capacity[3]	not affected by droughtiness (greater than 9 cm of available moisture)	moderately affected by droughtiness (9-5 cm of available moisture)	moderately severe or severely affected by droughtiness (less than 5 cm of available moisture)
Surface coarse fragments	seldom of significance in the province or not interpreted		
Depth to bedrock (m)	greater than 1.0	1.0-0.5	less than 0.5, greater than 0.2
Slope (%)	0-5	5-9	9-15
Soil drainage	rapidly, well, and moderately well drained	imperfectly drained	poorly drained

A fourth degree of soil limitation is also defined for field crops:

Unsuitable: - Flooding risk throughout most of growing season
- Less than 0.2 m to bedrock
- Slopes greater than 15%
- Soils with very poor drainage

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[1] Based on (1) Soil Capability Classification for Agriculture, The Canada Land Inventory, Report No. 2, 1965; and Rose, R.D., et al. 1969. Use of Soils in the Fourteen-County Appalachia Region of New York State. Agronomy Mimeo 69-5, Departmentof Agronomy, Cornell University.

[2] Crops that create conditions which are favorable for soil erosion (row crops such as corn) should be rated according to the Soil Limitations for Vegetable Crops Classes.

[3] Class limits are based on the amount of moisture in the surface 50 cm of soil. The class storage capacities are related to rainfall and evapotranspiration rates and plant requirements.

Table 17. Interpretation of Classes 2, 3, and 4 soils for some agricultural crops

Soil series	Map symbol	Degree of limitation[2]					
		Slope phase[1]	Cereal crops	Fall rye, wheat	Potato	Pasture	Alfalfa
Alberry	Al	B	Sl	M	Sl	Sl	M
		C	Sl	M	M	Sl	M
		D	M	M	S	Sl	M
		E	S	S	S-U	M	M
Brackley	Br	B;C;D	S	U	U	M	M
Bunbury	Bu	B;C;D	M-S	M-S	S	S	M-S
Carey Point	Cp	B;C;D	S	U	S-U	M	S
Charlottetown	Ch	B	Sl	M-S	Sl	Sl	M
		C	Sl	M-S	M	Sl	M
		D	M	M-S	S	Sl	M
		E	S	S	S-U	M	M
Crapaud	Cr	B;C;D	S	U	S-U	M	U
Culloden	Cu	B;C	M	M	M	M	M
		D	M	M	S	M	M
		E	S	S	S-U	S	M
Dunstaffnage	Df	B;C	S	S	S	S	S
Dunblane	Db	B	Sl	S	Sl	Sl	S
		C	Sl	S	M	Sl	S
		D	M	S	S	Sl	S
Duvar	Du	B;C;D	S	U	U	M	U
Emyvale	Em	B;C;D	S	S	S-U	S	M
Fifteen Point	Fp	B	M	S	M	Sl	S
		C	M	S	M	Sl	S
		D	M	S	S	Sl	S
		E	S	S	U	M	S
Gowanbrae	Go	B;C	M	S	M	M-S	S
		D	M	S	S	M-S	S
		E	S	U	S-U	S	S
Haliburton	Ha	B	Sl	M	Sl	Sl	M
		C	Sl	M	M	Sl	M
		D	M	M	S	Sl	M
		E	S	S	S-U	M	M
Haliburton Brook	Hab	B;C	M	M-S	M-S	Sl	S
		D	M	M-S	S	Sl	S
Kildare	Ki	B;C	M	M-S	M-S	Sl	S
		D	M	M-S	S	Sl	S
Malpeque	Ma	B;C;D	S	U	S-U	M	U
Munn Road	Mr	B;C;D	S	U	S-U	M	U
Newton	Ne	B	Sl	M	Sl	Sl	M
		C	Sl	M	M	Sl	M
		D	M	M	S	Sl	M
		E	S	S	U	M	M

Table 17. Interpretation of Classes 2, 3, and 4 soils for some agricultural crops (concluded)

		Degree of limitation[2]					
Soil series	Map symbol	Slope phase[1]	Cereal crops	Fall rye, wheat	Potato	Pasture	Alfalfa
O'Leary	OL	B;C;D	M	S	S	Sl	S
		E	S	S	S-U	M	S
Salt Grass Point	Sp	B;C;D	S	S	S-U	M	U
Tignish	Ti	B	Sl	S	Sl	Sl	M
		C	Sl	S	M	Sl	M
		D	M	S	S	Sl	M
		E	S	S	S-U	M	M
Uigg	Ui	B;C;D	S	U	S-U	M	U
West Point	Wp	B;C;D	S	U	S-U	M	U
Wolfe Inlet	Wf	B;C;D	S	U	S-U	M	U

[1] E slope phase includes I slope phase (5 to 15%) on the detailed maps.

[2] Sl = slight, or none; M = moderate; S = severe; U = unsuitable.

[3] Corrections for surface texture and soil phase must be added where they apply to interpretations for crops when using the detailed maps.

The interpretations shown in tables 14 and 17 apply to individual map units within delineations on the generalized mapset. On the detailed map set, surface texture, additional slope phases, and soil phases are indicated in some map symbols. They may affect interpretations for some crops and must be applied separately by the user to interpret detailed map delineations fully. The following is a list of the phases:

(1) Surface texture

A - sand: downgrade slight (Sl) and moderate (M) ratings to severe (S).
B - loamy sand: downgrade Sl to moderate M.
C - fine sandy loam (less than 8% clay): downgrade Sl to M.
D and E - fine sandy loam to loam: no effect on limitations.
F - clay loam: downgrade Sl and M ratings to S for vegetable crops only.

(2) Soil phases

A - stony or cobbly surface: downgrade Sl to M for vegetable crops only.
B - moderate drainage: downgrade Sl to M and M to S for all crops except pasture grasses.
C - bedrock (50 to 100 cm): downgrade Sl to M for vegetable crops only.
D - bedrock (50 to 100 cm) unconsolidated: no effect or not interpreted.
E - cobbly subsoil: downgrade Sl to M for vegetable crops only.

(3) Slope phase

I - slope complex DE (5 to 15%) interpreted as E slope.
J - slope complex EF (9 to 30%) interpreted as F slope.

Computer-plotted agricultural interpretations of detailed maps are available on request. The foregoing interpretive corrections for irregular open phases are automatically applied by the computer. Such detailed interpreted maps are available from Ottawa through the Soil Survey Office on a cost-recovery basis.

Capability classification and interpretative ratings for forestry

This section provides an interpretation of soil survey information in terms of forestry. Included is a Land Capability Classification for forestry, a species suitability rating, and interpretations of soils relative to woodland management. For woodland management, the degrees of limitation slight to none, moderate, and severe are defined for access road construction, equipment limitations, erosion hazards, and windthrow hazards.

At present, productivity ratings for soil units are not well established. Accurate assessment of the true productivity of natural stands is difficult because of variations in natural stands due to differences in density and stand history (insect infestations, fire, high-grading, and so forth). In Prince Edward Island a high percentage of the land was cleared for agricultural use, and although some of it has reverted to forestry, most of the better land has been retained for agricultural crops. Past forestry management input has been minimal and there is insufficient knowledge of the relationship between natural forest stands and soils. To further interpret the effect of silvicultural practice on forest soil productivity is even more difficult. There are indications that more intensive management can no longer be avoided. It is hoped that as the use of land for this purpose intensifies, the relationships with soils can be more accurately determined to maximize productivity.

Land capability classification

The Land Capability Classification for forestry is based on soil's ability to grow commercial timber. As defined in Canada Land Inventory Report No. 4(8), three categories are used in this system: the capability class, the capability subclass, and the indicator species.

(1) The Capability Class: The capability class is an expression of all the environmental factors as they apply to tree growth. The assignment of each land unit to a particular class is based on all known or inferred information about the unit, including soil moisture, texture, rooting depth, fertility, climate, stoniness, and vegetation, or more succinctly, it is the degree of limitation to the growth of commercial forests. Associated with each capability class is a productivity range based on the mean annual increment of the best species or group of species adapted to the site. Expressed in cubic meters per hectare per annum, the classes are as follows: Class 1 - greater than 7.7, Class 2 - 6.3 to 7.7, Class 3 - 4.9 to 6.2, Class 4 - 3.5 to 4.8, Class 5 - 2.2 to 3.4, Class 6 - 0.7 to 2.1, Class 7 - less than 0.7. The productivity ranges are for normal or fully stocked stands before site improvements or imposed management. Thinning, bark, or branch wood were not included in increment estimates.

(2) The capability subclass: Plant response or tree growth is determined by the factor that is limiting or least optimum. As originally prepared and used (CLI), the subclass indicated the environmental factor, that is, the soil property or climate most limiting to tree growth. For this report, only soil-related factors are considered. The kind or kinds of soil limitations can be important for forest management or for site improvements that might be considered to increase productivity. The capability subclasses found within the survey area are as follows:

Climate:	U-exposure. This factor is significant along the coast and over much of the island. It is not listed because only soil limitations are considered.
Soil moisture:	M-soil moisture deficiency. W-soil moisture excess.
Permeability, depth of rooting:	D-physical restrictions to roots caused by dense or consolidated layers other than bedrock. R-restrictions of rooting zone by bedrock.
Other soil factors:	F-low fertility. I-soils periodically inundated by streams or lakes.

(3) The indicator species: The tree species that can be expected to yield the volume associated with each class is shown as part of the symbol. For Prince Edward Island, white spruce was used as the indicator species.

Species suitability rating

In addition to the capability classification, an interpretation for species suitability for soil groupings is presented.

Species suitability ratings are the results of attempts to correlate species characteristics with corresponding soil properties. This was coupled with observations made in the field. For such a rating tree species are categorized as suitable, limited suitability, or unsuitable for each soil group. The species or groups of species are not listed in any order of suitability. Only commercially adapted tree species are considered with the exception of lowbush blueberry plants, which are presented here for convenience of tabulation.

Interpretations of soils relative to woodland management include the following: access road construction; equipment limitations; gully erosion hazards; and windthrow hazards. For each, the degrees of limitation slight to none, moderate, and severe are defined. Although soil surveys are multipurpose oriented, it was necessary during soil survey field work to place somewhat more emphasis on cleared land because forest vegetation hinders or slows down delineation of some soil properties either by photo interpretation or by direct observation. Therefore, some forested areas, particularly if poorly drained, are less well delineated in soil units. Slope seepage or telluric sites are known to exist and affect productivity but the total area is small and not specifically mapped or identified. Nonetheless, the soil map does provide an adequate base on which to superimpose future forestry inputs and information. For special silvicultural projects where more detailed soils information is required, additional detailed soil surveying must be done on a small-area or plot basis.

Access road construction: Table 18 indicates criteria used in rating soils for access road construction. Such construction and maintenance is a major function of all woodland operations. Regardless of size or type of operation, roads are required and ignoring soil properties can lead to increased costs. Such roads are designed for low speeds and generally constructed of on-site material with little or no hauling of fill.

Equipment limitations: Table 19 indicates criteria used in rating soils for equipment use. The interpretation considers slope and soil properties (texture, drainage) and the degree to which they restrict the use of equipment commonly used in woodland operations. The interpretation is based on both the degree of difficulty of machine operation and potential soil damage. All vehicles are assumed to be currently available or used and to be equipped with rubber tires.

Erosion hazard: Table 20 indicates criteria used in rating forested land for potential erosion. These criteria are based on the assumption that gully erosion is the major form. The erosion that occurs is concerned mainly with skid trails, access roads, fire lanes, or landing areas where the mineral soil is exposed. Under normal forest conditions the soil is protected by an organic surface mat and ground flora, even after the forest vegetation has been removed. Although erosion under forest land use is a minor problem or of reduced significance, it is still environmentally undesirable and will increase as use becomes more intensive. Therefore, a general guide to soil erodibility may be beneficial.

Table 18. Soil limitations for access road construction[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Drainage[2]	Rapidly, well, and moderately well drained	Imperfectly[6] drained	Poorly[6] and very poorly drained
Material suitability[3]	GW, CP, SW, SP, GM,[4] GC,[4] SM,[4] SC[4]	CL (PI[5] less than 15)	GL (PI[5] greater than 15) ML, CH, MH
Slope (%)	0-5	5-15	<15
Stoniness	Not a factor on soils in the province.		

[1] Access roads are designed for low speeds and are generally constructed by use of on-site materials with little or no hauling of fill. Main haul roads can be interpreted under Soil Limitations for Local Roads and Streets. Note: Organic soils are rated as severe or unsuitable on an individual basis.

[2] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dep. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[3] Material suitability is based on the Unified Soil Classification System. See Appendix A.

[4] Downgrade to moderate if more than 35% passes the No. 200 sieve and road construction and use is intended for early spring.

[5] PI means plasticity index.

[6] Upgrade one class if coarse loamy ablational till or outwash gravel.

Table 19. Soil limitations for equipment use[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Soil drainage class[1]			
<35% silt and clay	Rapidly, well, moderately well, and imperfectly drained	Poorly drained	Very poorly drained
35-70% silt and clay	Well, moderately well drained	Imperfectly and poorly[2] drained	Very poorly drained
>70% silt and clay	Moderately well drained	Imperfectly[3] drained	Poorly and very poorly drained
Slope[1] (%)	0-9	9-30	>30
Stoniness	Not a factor on soils in the province.		

Note: Organic soils are rated as severe or unsuitable on an individual basis.

[1] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dep. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[2] Downgrade one class if operations carried out during early spring.

[3] Downgrade one class if operations carried out in early spring or late fall.

Table 20. Soil susceptibility to erosion - guideline criteria

Major soil properties influencing interpretation	Degree of limitation		
	Slight to none	Moderate	Severe
Slope[1] range % Class			
Permeability at 100 cm depth >0.5 cm/h	0-9 B, C, D[2]	9-25 E,[4] F[2](part)	25+ F(part), G
Permeability at 100 cm depth <0.5 cm/h	0-5 A, B, C	5-15 D, E[3]	15-45 F, G

Note: These ratings do not apply to organic soils, they are shown as N.C. - not classified.

[1] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dep. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[2] Downgrade one class if appreciable amount of fine sand and/or silt.

[3] Downgrade one class if texture is silty clay (SiC) or silty clay loam (SiCl).

[4] Upgrade one class if gravel.

Table 21. Soil susceptibility to windthrow - guideline criteria

Major soil properties influencing interpretation	Degree of limitation		
	Slight to none	Moderate	Severe
Depth of restricting layer (cm)	>50[1]	20-50	<20
Soil drainage class[2]	Rapidly, well, moderately well, and imperfectly[3] drained	Poorly drained	Very poorly drained
Stoniness	Not a factor on soils in the province.		

Note: Organic soils are rated as severe or N.C. (not classified) on an individual basis.

[1] If the texture of the rooting zone is predominantly sand or silty clay to clay, decrease the rating to moderate. (These textures tend to inhibit proper root growth and/or support).

[2] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dep. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[3] Decrease one class for fine loamy and clayey textured soils.

Table 22. Capability classification and degree of limitation[a] affecting forestry use

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
Abney Road	0-2	7W	U	U	S	N.C.[b]
Alberry						
Al; Al B C	0-5	4F	Sl	Sl	Sl	Sl
Al D	5-9	4F	M	Sl	Sl	M
Al E	9-15	4F	M	M	Sl	M
Al; Al F G	15+	4F	S	M-S	Sl	M-S
Arlington	0-2	7W	U	U	N.C.	N.C.
Baptist Point						
Bp; Bp; Bp B C D	0-9	6W	S	S	S	Sl
Brackley						
Br; Br B C	0-5	5WF	M	Sl	Sl	Sl
Br D	5-9	5WF	M	Sl	Sl	M
Bunbury						
Bu; Bu B C	0-5	5FM	Sl	Sl	M	Sl
Bu D	5-9	5FM	M	Sl	M	Sl
Bu E	9-15	5FM	M	M	M	M
Canavoy	0-2	6W	U	U	S	N.C.

Table 22. Capability classification and degree of limitation[a] affecting forestry use (continued)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
Carey Point						
Cp; Cp; Cp B C D	0-9	5FW	M	Sl	Sl	Sl-M
Cp E	9-15	5FW	M	M	Sl	M
Charlottetown						
Ch; Ch B C	0-5	4F	Sl	Sl	Sl	Sl
Ch D	5-9	4F	M	Sl	Sl	M
Ch E	9-15	4F	M	M	Sl	M
Ch; Ch F G	15+	4F	S	M-S	Sl	S
Crapaud						
Cr; Cr B C	0-5	5WF	M	Sl	Sl	Sl
Cr D	5-9	5WF	M	Sl	S	M
Culloden						
Cu; Cu B C	0-5	4F	Sl	Sl	Sl	Sl
Cu D	5-9	4F	M	Sl	Sl	M
Cu E	9-15	4F	M	M	Sl	M
Cu; Cu F G	15+	4F	S	M-S	Sl	S
Dunblane						
Db; Db B C	0-5	4D	M	Sl	Sl-M	Sl

Table 22. Capability classification and degree of limitation[a] affecting forestry use (continued)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
Db/D	5-15	4D	M	Sl	Sl-M	M
Dunstaffnage						
Df/B; Df/C	0-5	5FM	Sl	Sl	Sl	Sl
Df/D; Df/E	5-15	5FM	M	M	Sl	M
Df/F; Df/G	15+	5FM	S	M-S	Sl	S
Duvar						
Du/B; Du/C	0-5	5WD	M-S	M	M	Sl
Du/D	5-9	5WD	M-S	M	M	M
Egmont						
Eg/B; Eg/C	0-5	6WD	S	S	S	Sl
Eg/D	5-9	6WD	S	S	S	M
Emyvale						
Em/B; Em/C	0-5	5FM	Sl	Sl	M	Sl
Em/D	5-9	5FM	M	Sl	M	M
Em/E	9-15	5FM	M	M	M	M
Em/F; Em/G	15+	5FM	S	M-S	M	S
Enmore	0-2	6W	U	U	N.C.	Sl

Table 22. Capability classification and degree of limitation[a] affecting forestry use (continued)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
Fifteen Point						
Fp; Fp B C	0-5	5FD	M	Sl	M	Sl
Fp D	5-9	5FD	M	Sl	M	M
Fp E	9-15	5FD	M	M	M	S
Frenchfort	0-2	7W	U	U	N.C.	N.C.
Gowanbrae						
Go; Go B C	0-5	4F	Sl	Sl	Sl	Sl
Go D	5-9	4F	M	Sl	Sl	M
Go E	9-15	4F	M	M	Sl	M
Go; Go F G	15+	4F	S	M-S	Sl	S
Haliburton and Haliburton Brook						
Ha; Ha; HaB; HaB B C B C	0-5	4F	Sl	Sl	Sl	Sl
Ha; HaB D D	5-9	4F	M	Sl	Sl	M
Ha E	9-15	4F	M	M	Sl	M
Ha F	15-30	4F	S	M	Sl	S
Hazelbrook	0-2	7W	U	U	N.C.	N.C.
Hebron						
He; He; He B C D	0-9	5W	M	M	Sl	Sl

Table 22. Capability classification and degree of limitation[a] affecting forestry use (continued)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
Kildare						
$\frac{\text{Ki}}{\text{B}}$; $\frac{\text{Ki}}{\text{C}}$	0-5	5FM	Sl	Sl	Sl	Sl
$\frac{\text{Ki}}{\text{D}}$	5-9	5FM	M	Sl	Sl	M
$\frac{\text{Ki}}{\text{E}}$	9-15	5FM	M	M	Sl	M
$\frac{\text{Ki}}{\text{F}}$	15-30	5FM	S	M	Sl	S
Lake Verde	0-2	6W	U	U	N.C.	N.C.
Locke Road						
$\frac{\text{Lr}}{\text{B}}$; $\frac{\text{Lr}}{\text{C}}$	0-5	6W	S	S	S	Sl
$\frac{\text{Lr}}{\text{D}}$	5-9	6W	S	S	S	M
Malpeque						
$\frac{\text{Ma}}{\text{B}}$; $\frac{\text{Ma}}{\text{C}}$	0-5	5W	M	M	Sl-M	Sl
$\frac{\text{Ma}}{\text{D}}$	5-9	5W	M	M	Sl-M	M
$\frac{\text{Ma}}{\text{E}}$	9-15	5W	M	M	Sl-M	M
Margate						
$\frac{\text{Mg}}{\text{B}}$; $\frac{\text{Mg}}{\text{C}}$	0-5	6W	S	S	M-S	Sl
$\frac{\text{Mg}}{\text{D}}$	5-9	6W	S	S	M-S	M
Mossy Point						
$\frac{\text{Mp}}{\text{B}}$; $\frac{\text{Mp}}{\text{C}}$	0-5	6W	S	S	S	Sl

Table 22. Capability classification and degree of limitation[a] affecting forestry use (continued)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
$\frac{\text{Mp}}{\text{D}}$	5-9	6W	S	S	S	M
Munn Road						
$\frac{\text{Mr}}{\text{B}}$; $\frac{\text{Mr}}{\text{C}}$	0-5	5WD	M	M	M	Sl
$\frac{\text{Mr}}{\text{D}}$	5-9	5WD	M	M	M	M
$\frac{\text{Mr}}{\text{E}}$	9-15	5WD	M	M	M	M
Newton						
$\frac{\text{Ne}}{\text{B}}$; $\frac{\text{Ne}}{\text{C}}$	0-5	4F	Sl	Sl	Sl	Sl
$\frac{\text{Ne}}{\text{D}}$	5-9	4F	M	Sl	Sl	Sl
$\frac{\text{Ne}}{\text{E}}$	9-15	4F	M	M	Sl	M
O'Leary						
$\frac{\text{Ol}}{\text{B}}$; $\frac{\text{Ol}}{\text{C}}$	0-5	4FW	M	Sl	Sl	Sl
$\frac{\text{Ol}}{\text{D}}$	5-9	4FW	M	Sl	Sl	M
$\frac{\text{Ol}}{\text{E}}$	9-15	4FW	M	M	Sl	M
$\frac{\text{Ol}}{\text{F}}$	15-30	4FW	S	M	Sl	S

Table 22. Capability classification and degree of limitation[a] affecting forestry use (continued)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
Orwell						
Or; Or B C	0-5	6W	S	S	S	Sl
Or D	5-9	6W	S	M-S	M-S	M
Pisquid	0-2	7W	U	U	S	N.C.
Pownal	0-2	7W	U	U	N.C.	N.C.
Rocky Point						
Rp; Rp B C	0-5	6W	S	S	S	Sl
Rp D	5-9	6W	S	S	S	M
Salt Grass Point						
Sp; Sp B C	0-5	5W	M	M	Sl	Sl
Sp D	5-9	5W	M	M	Sl	M
Tignish						
Ti; Ti B C	0-5	4F	M	Sl	Sl	Sl
Ti D	5-9	4F	M	Sl	Sl	M
Ti E	9-15	4F	M	M	Sl	M
Ti F	15-30	4F	S	M	Sl	S
Uigg						
Ui; Ui B C	0-5	5WF	M	Sl	Sl	Sl
Ui D	5-9	5WF	M	Sl	Sl	M

Table 22. Capability classification and degree of limitation[a] affecting forestry use (concluded)

Map unit and phase	Slope (%)	Capability class, and subclass	Access road construction	Equipment use	Windthrow hazard	Soil susceptibility to erosion
West Point						
Wp; Wp B C	0-5	5W	M	M	Sl	Sl
Wp D	5-9	5W	M	M	Sl	M
Winsloe						
Wh; Wh B C	0-5	6W	S	M-S	M-S	Sl
Wh D	5-9	6W	S	M-S	M-S	M
Wolfe Inlet						
Wf; Wf B C	0-5	5FD	M	M	M	Sl
Wf D	5-9	5FD	M	M	M	M
Wood Island						
Wi; Wi B C	0-5	6W	S	M	Sl	Sl
Wi D	5-9	6W	S	M	Sl	Sl
Dune Sand	0-15	7MF	U	U	N.C.	N.C.
Coastal Beach	0-30	N.C.	N.C.	N.C.	N.C.	N.C.
Salt Marsh	0-5	7I				
Steepland	30+	N.C.	S	S	N.C.	S
Stream Complex	0-5	5-7I	U	U	N.C.	N.C.

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[a] Sl = slight, or none; M = moderate; S = severe; U = unsuitable.

[b] N.C. = not classified.

__Windthrow hazards__: Table 21 indicates criteria used in rating island soils for windthrow hazard.

Windthrow within a forest can occur for various reasons. Excluding such factors as topography or exposure, as well as differences due to tree species, it is the physical condition of the soil that ultimately determines whether or not windthrow will occur. The soil characteristics of concern are as follows:

(1) Depth of soil material over root-inhibiting layers such as bedrock, cemented or hardpan layers, dense compact tills, and other root-inhibiting layers.
(2) Drainage as it effects the rooting depth by acting as an inhibitor, and the mechanical strength of the soil.
(3) Stoniness as it reduces the space available for proper root growth.

The capability classification and ratings of the soils for access road construction, equipment use, and windthrow and erosion hazards are given in Table 22. Interpretations have inherent limitations due to lack of data on which to make firm comparisons. The capability classes are based on Canada Land Inventory information, in which some soil series were subjectively classified by rough estimation; all are subject to change as better information becomes available. Taken separately, physical soil properties cannot adequately describe soil productivity conditions or management groups and requirements. Because many of the soils have similar potential productivity and management requirements their combination into soil performance groups was not attempted, but the suitability soil groups (Table 23) can be considered as an attempt in this direction. The interpretation (Table 23) warrants low credibility but if selection of sites is to offer the planted tree a fair chance for survival and vigor, more information and research in this direction is required. Many forested areas consist of dominantly poor-quality or undesirable species, and this supports the opinion that the state of abuse and neglect of the island's forests is as bad as elsewhere in Canada. The current policy of reforestation is a positive sign of increased efforts to upgrade the forest resource.

Engineering aspects and land use planning

Soil surveys provide a general purpose inventory of the soil resource base for agriculture and forestry. The report and soil maps also contain information of value to engineers and land use planners or others interested in these aspects. Depending on the problem of concern the information may be very useful or less so. Because it is the user who must evaluate the usefulness of the information the objective is to present the survey information in a form suitable for use and application. To this end users are grouped in the following categories:

(1) Conservation and transportation engineers
(2) Land use planners for community development
(3) Geotechnical engineers and geologists

(1) Conservation and transportation engineers

This group can make direct use of the soil survey maps. Parts of highways and other pavements may be constructed directly on the soil that provides the

Table 23. Interpretations of soil groups for tree growth suitability and suitability for lowbush blueberry

Soil group	White pine	Red pine	Spruce, fir	Birch, maple	Lowbush blueberry
1. Deep, well, and moderately well drained soils - high to moderately high available moisture (a) Till - Fifteen Point, Tignish, O'Leary, Charlottetown. (b) Glaciofluvial - Newton. (c) Marine-glaciomarine - Dunblane, Haliburton Brook.	Suitable	Limited suitability	Suitable	Suitable	Limited suitability
2. Deep, somewhat rapidly drained soils - moderate to low available moisture (a) Till - Alberry, Gowanbrae. (b) Glaciofluvial - Culloden, Bunbury, Dunstaffnage. (c) Marine-glaciomarine - Kildare, Haliburton.	Suitable	Suitable	Limited suitability	Limited suitability	Suitable
3. Imperfect and somewhat poorly drained soils - planting survival may be poor (a) Till - Wolfe Inlet, Duvar, Crapaud, Malpeque, Brackley. (b) Glaciofluvial - Hebron, Uigg. (c) Glaciomarine - West Point, Carey Point, Salt Grass Point, Munn Road.	Limited suitability	Unsuitable	Limited suitability	Limited suitability	Limited suitability
4. Poor and very poorly drained soils - planting success poor to unsuitable (a) Till - Egmont, Margate, Winsloe. (b) Glaciofluvial - Wood Island, Orwell. (c) Glaciomarine - Rocky Point, Mossy Point, Baptist Point, Locke Road.	Limited suitability	Unsuitable	Limited suitability	Limited suitability	Unsuitable to limited suitability
5. Soils shallow over bedrock - Emyvale	Limited suitability	Unsuitable	Limited suitability	Limited suitability	Suitable to limited suitability
6. Organic soils					
Abney Road, Lake Verde, Canavoy, Enmore.	Unsuitable	Unsuitable	Limited suitability	Limited suitability	Unsuitable
Arlington, Hazelbrook, Fenchfort, Pownal, Pisquid.	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable

foundations of these structures. The pedological classification system considers the soil in situ and takes into account not only the parent materials but also the effects of soil climate, topography, drainage, capillarity, and so forth.

Generally, it may be found that the performance of highways and other pavement structures can be correlated with the soil series. This is done by plotting existing highway locations onto the soil map or by transferring soil map data to general layout plans.

The performance data, if available, are then added and analyzed to determine to what degree performance can be related to map units.

Similar types of performance correlations may be applied to soil stabilization (for example, soil cement application), runoff and infiltration characteristics, and possibly other relationships.

For those interested, the following procedure should be followed:

(a) Become familiar with the engineering significance of pedology.
(b) Identify the soil series by their names in the particular area of interest.
(c) Read the generalized and detailed soil descriptions in the report and select all items of engineering significance.
(d) Tabulate all this data and add the relevant test data from Tables 23, 24, and 25 in this section.
(e) Visit the site to identify the terrain characteristics and dig test holes to identify the soil profile as given in the report and verify that these are definitely characteristics of that map unit.
(f) Apply the performance data available and extrapolate the known performance to the project sites.
The soil map can then become a useful reference document.

(2) Land use planners for community development

For specialists in this field the interpretive type of information may be the most relevant. The section "Soils and community development" should be consulted. The information can be used as presented or it can be reinterpreted to fit the needs of the user or of specific projects. Thus, as an aid to community development, the planner can prepare interpretive maps for septic tank disposal fields, using three or four color combinations to show soil areas with varying degrees of limitation according to recommendations given. Alternatively, the planner can superimpose data from other sources and improve or alter the recommendations with experience gained.

(3) Geotechnical engineers and geologists

For foundation engineering, for site investigation, and for construction material sources, the soil classification system and the soil survey map may not be directly applicable for most everyday problems. This is because soil series are differentiated by the soil profile properties in surface layers of surficial deposits. Engineers and geologists may find soil surveys useful for two main reasons:

(i) There are special engineering problems that are definitely concerned with the altered and unaltered soil material within 1 or 2 m of the soil surface.

(ii) During the soil survey the surveyor is very interested in underlying materials, even though the map units may have depth limits imposed by definition or because of limitations of field equipment or other resources available during the survey.

For those engineering problems that definitely do concern the upper layers of soil, the reader is referred to the section "Conservation and transportation engineers." Typical problems of concern include septic tank filter fields, watershed control of runoff and drainage, pipelines, concrete foundations, and search for construction materials, that is, topsoil, sand, and gravel. For those engineering problems concerned with the deeper layers of soil materials, information may be gained from the soil map by inference. The user should be familiar with the usage by pedologists versus engineers of related terms such as consistence, soil, and textural classes.

This is a soil survey report and the meaning of terms used should be interpreted in the pedological sense. Fig. 14 shows the comparison between soil textural classes (USDA) and two engineering systems of classification of soil particle sizes: the unified and AASHO systems of classfication. Most pedological terms used are listed in the Glossary.

The soil map and limitations

The soil map set presented with this report is at a scale of 1:75 000. It was produced by complexing or generalizing information contained in a detailed map set that is available on open file from the Soil Survey Office, Research Station, Research Branch, Agriculture Canada, P.O. Box 1210, Carlottetown, P.E.I., C1A 7M8. The detailed maps are at a scale of 1:10 000 and an index is provided for the 355 maps that are available for the island. The map legend is similar for both map sets but the detail of soil mapping is greater on the 1:10 000 scale maps and their value for some land planning and engineering uses should be significantly increased.

Some limitations of the soil maps for the island when used for interpretations must be pointed out. During field mapping soil examination and differentiation was based on profile depths of 1.5 m, or less. The depths of surficial deposits, particularly glacial till, were frequently less than 1 m and infrequently deeper than 2 m. The underlying material, usually regolith or bedrock, exhibits rapid vertical facies change but the distinction between regolith and till is often difficult to recognize when there is no marked change in physical properties such as texture or consistence. Such changes when they occur at the soil surface are more easily identified through photo interpretation and observation. Soil survey maps are not intended to be site-specific and data given cannot substitute for site investigation. The soil maps should be used within the limitations expressed here and readers should be familiar with the estimated purity of map units. On the 1:10 000-scale maps the estimated purity of map units is explained in the section titled Methods of survey. On the 1:75 000-scale maps the decile percentage of map units within delineations is indicated in the symbol.

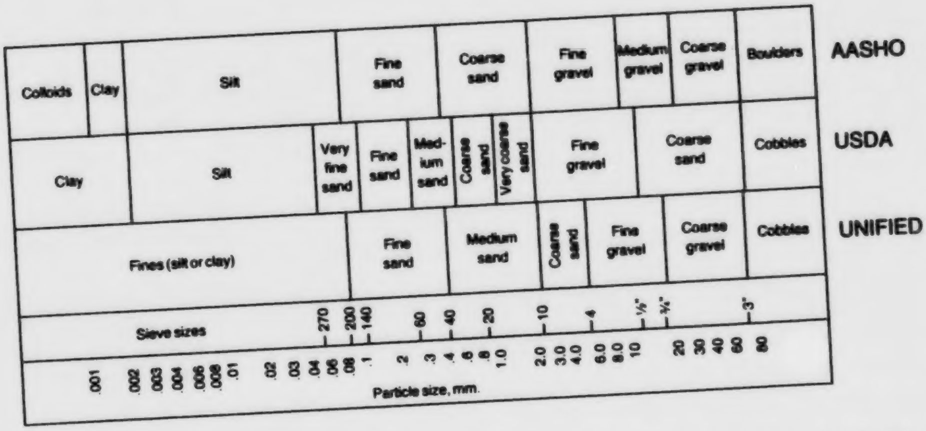
Colloids
Clay
Silt
Fine sand
Coarse sand
Fine gravel
Medium gravel
Coarse gravel
Boulders
AASHO
Clay
Silt
Very fine sand
Fine sand
Med-ium sand
Coarse sand
Very coarse sand
Fine gravel
Coarse sand
Cobbles
USDA
Fines (silt or clay)
Fine sand
Medium sand
Coarse sand
Fine gravel
Coarse gravel
Cobbles
UNIFIED
Sieve sizes
270
200
140
60
40
20
10
4
½"
¾"
3"
.001
.002
.003
.004
.006
.008
.01
.02
.03
.04
.06
.08
.1
.2
.3
.4
.6
.8
1.0
2.0
3.0
4.0
6.0
8.0
10
20
30
40
60
80
Particle size, mm.

Figure 14. Comparison of particle size classes by pedologists or engineers. Particle size limits of American Association of State Highway Officials, the U.S. Dept. of Agriculture, and unified classifications.

The geotechnical setting and engineering soil groups

For soil studies by engineers, geologists, or pedologists the geotechnical setting is a priority. Figs. 3, 4, and 5 explain factors such as bedrock geology, surficial deposits, slope, and drainage divides. These figures, together with the generalized map, portray the geotechnical setting of the area. In this specific soil survey it is recognized that there is inadequate information on many engineering properties such as soil strength and compressibility, thickness of soil strata, and groundwater flow patterns. For these reasons engineering evaluations can be facilitated by placing the soil map units into fewer, more distinctive groupings. The groupings rely mainly on similar characteristics of the subsoil, or B horizon, and the parent material, or C horizon. Subgroups are somewhat arbitrarily employed to indicate less distinctive textural differences. They have not been used to separate poorly drained soils but the profile drainage characteristics within the grouping are indicated. The boundaries of the groups coincide with the limits of soil associations which, in turn, coincide with the boundaries of surficial deposits. Table 24 lists these groups and indicates the relationship with parent materials, soil map unit, profile drainage, and some profile characteristics. A brief description of the properties of the groups and subgroups is given, including some comments on suitabilities and limitations for land use. Laboratory data are listed in Table 25, which includes the classification of the major soils representative of the group.

Table 26 lists all the soil units alphabetically, summarizes their general suitability for topsoil, sand, and gravel, and road fill, and indicates soil features affecting shallow excavations, agricultural drainage, and off-road trafficability. In addition, the suitability or limitation for various uses is given in subsequent sections where guidelines used are included.

All samples were collected by survey personnel and the results completed in soil survey laboratories. The information provides an estimate of engineering properties within soil series and should serve as a geotechnical guide for the soils of the province. Test data for the lower B and C horizons of one or more sites of the major soil series are presented. Mechanical analysis was determined by a combination of sieve and pipette analyses. Liquid, plastic, and shrinkage limits were determined according to procedures of the American Society for Testing and Materials (14), whereas bulk density and saturated hydraulic conductivity were determined on undisturbed soil cores.

Engineering Group 1: Soils associated with dominantly loam glacial till

Soils included in this group have formed on slightly to moderately plastic, strongly acidic, reddish brown glacial till. The tills are stone free but relatively shallow, generally less than 2 m thick. They overlie relatively soft residual material or sedimentary bedrock. The bedrock includes sandstone, siltstone, and shale with occasional pockets of conglomerate and thin beds of mudstone breccia. Gradations of consolidation occur but excavation is almost always easily accomplished with light machinery.

Two subgroups are identified based on the texture of the soil profile and underlying till material. Soils included in subgroup 1A are loam, whereas those included in 1B are loam to clay loam. Within each subgroup, map units are identified mainly on the basis of wetness or profile drainage morphology.

Table 24. Engineering groups of Prince Edward Island soil groups

Group	Subgroup	Parent material (C horizon)	Soil series	Drainage	Profile characteristics
1	1A	Loam glacial till, generally less than 2 m thick over regolith	Tignish (Ti)	Well	Stone-free solum, less than 18% clay and less than 50% sand in parent material
			O'Leary (Ol)	Moderately well	
			Duvar (Du)	Imperfect	
			Margate (Mg)	Poor	
	1B	Loam to clay loam glacial till, generally less than 2 m thick over regolith	Fifteen Point (Fp)	Moderately well	Stone-free solum, 18-35% clay and less than 50% sand in parent material
			Wolfe Inlet (Wf)	Imperfect	
			Egmont (Eg)	Poor	
2	2A	Loamy sand to fine sandy loam glacial till, generally less than 2 m thick over regolith or consolidated bedrock	Charlottetown (Ch)	Well	Stone-free solum, 8-18% clay and more than 50% sand in parent material
			Malpeque (Ma)	Imperfect	
			Winsloe (Wn)	Poor and very poor	
			Alberry (Al)	Well	Stone-free solum, less than 8% clay and more than 65% sand in parent material
			Crapaud (Cr)	Imperfect	
			Gowanbrae (Go)	Rapid	Water-deposited loamy sand solum over till.
			Brackley (Br)	Imperfect	
	2B	Similar to 2A except sandstone-shale bedrock or regolith occurs within 1 m of the soil surface	Charlottetown (Chd)	Well	Stone-free solum, 8-18% clay and more than 50% sand in parent material.
			Alberry (Ald)	Well	
			Emyvale (Em)	Variable	Solum less than 50 cm over bedrock.
3	3A	Glaciomarine and non-compact till; gravelly sand, loamy sand, fine sandy loam, minor silt. Variable depths.	Haliburton (Ha)	Well	Stone-free fine sandy loam solum, 8-18% clay in parent material
			Haliburton Brock (Hab)	Moderately Well	
			Salt Grass Point (Sp)	Imperfect	
			Mossy Point (Mp)	Poor and very poor	
			Kildare (Ki)	Rapid	Stone-free loamy sand, gravelly loamy sand and, sandy loam solum, less than 8% clay
			Carey Point (Cp)	Imperfect	
			Rocky Point (Rp)	Poor and very poor	
	3B	Glaciomarine and non-compact till; silt loam, clay loam, minor gravel. Variable depths.	Dunblane (Db)	Well	Stone-free fine sandy loam to silt loam solum
			West Point (Wp)	Imperfect	
			Baptist Point (Bp)	Poor and very poor	
			Munn Road (Mr)	Imperfect	Stone-free loam to clay loam solum
			Locke Road (Lr)	Very poor	
4		Glaciofluvial deposit; gravelly sand, loamy sand, sandy loam, minor silt. Variable depths.	Dunstaffnage (Df)	Rapid	Gravelly to sandy loam solum
			Wood Island (Wi)	Poor	
			Culloden (Cu)	Rapid	
			Bunbury (Bu)	Rapid	
			Uigg (Ui)	Imperfect	
			Newton (Ne)	Well	Fine sandy loam to very fine sandy loam, loam, silt loam, and silt
			Hebron (He)	Imperfect	
			Orwell (Or)	Poor	

Table 24. Engineering groups of Prince Edward Island soil groups (concluded)

Group	Subgroup	Parent material (C horizon)	Soil series	Drainage	Profile characteristics
5	5A	Dominantly thick organic deposits; 1 to 5 m thick	Arlington (Ar) Pownal (Po) Pisquid (Pi)	Very poor	Dominantly fibric-mesic sphagnum peat solum
	5B	Dominantly thin organic deposits, generally less than 1.5 m thick	Alney Road (Ab) Hazelbrook (Hz) Canvoy (Ca) Enmore (En) Frenchfort (Fr) Lake Verde (Ve)	Very poor	Peat material of mixed botanical origin and decomposition
6		Miscellaneous soil and land types	Dune Sand (Ds)	Rapid	Sand deposits
			Coastal Beach (Cb)	N.C.	Variable
			Salt Marsh (Sm)	Very poor	Sand, silts, clays
			Stream Complex (Sc)	Dominantly poor	Sand, silts

Table 25. Engineering test data for Prince Edward Island soil groups

		Sieve analysis					Fraction smaller		Classification			Liquid limit	Plastic limit	Shrinkage limit	Hyd. Cond.	Bulk density	pH in $CaCl_2$
		Fraction 76 mm	Passing sieve number														
Group number			4	10	40	200	5μ	2μ	ASSHO[1]	Unif.[2]	USDA[3]						
	(cm)	(%)	(%)				(%	%)				(%)	(%)	(%)	(cm/h)	(g/cm^3)	
							Tignish N 46°11'42" W 62°56'35"										
1A	38–70		100	100	97	62	26	12	A4	ML	L	23.1	18.1	17.3	0.02	1.80	4.2
	120–152	0–5	100	100	97	63	28	13	A4	ML	L	23.1	18.6	17.9	0.01	1.82	4.3
							Tignish N 46°43'00" W 64°20'52"										
1A	30–100		100	98	92	62	25	11	A4	ML	L	21.8	20.9	18.7	0.6	1.62	4.6
	100–120	0–5	88	82	77	44	22	9	A4	SM	FSL	18.4	17.6	17.2	0.6	1.80	4.8
							O'Leary N 46°54'26" W 64°09'12"										
1A	29–90		99	96	90	59	31	18	A4	ML	L	23.6	17.5	16.2	1.0	1.78	4.3
	90–120	0–5	100	98	93	57	29	18	A4	ML	L	23.0	19.8	17.8	0.9	1.86	4.2
							O'Leary N 46°43'17" W 64°14'46"										
1A	20–72		100	95	88	60	32	19	A4	ML	L	21.0	17.7	16.2	0.03	1.70	4.2
	120–160	0–5	100	99	95	64	23	15	A4	SC	FSL	22.1	16.6	14.4	0.001	1.96	4.4
							Duvar N 46°42'50" W 64°12'03"										
1A	24–67		98	94	88	59	23	16	A4	ML	L	20.2	18.5	16.2	0.05	1.77	4.1
	67–100	0–5	98	95	90	58	26	18	A4	ML–CL	L	21.0	15.7	13.7	0.05	1.94	4.3
							Margate N 46°43'59" W 64°17'02"										
1A	80–100		97	92	88	60	31	15	A4	ML	L	19.5	16.0	14.1	0.04	1.80	4.3
	100–120	0–5	95	90	83	62	31	14	A4	ML–CL	L	22.4	16.5	14.2	0.01	1.90	4.3
							Margate N 46°34'57" W 63°56'01"										
1A	65–85		88	80	72	51	33	22	A4	ML–CL	L	23.8	18.4	13.8	0.2	1.80	4.1
	85–100	0–5	98	95	86	59	33	22	A4	ML–CL	L	23.2	17.4	14.4	0.002	1.92	6.5
							Fifteen Point N 46°08'00" W 62°55'45"										
1B	20–76		100	97	95	70	29	22	A4	ML–CL	L 5	27.3	19.7	15.4		1.93	4.0
	76–90	0–5	100	98	97	83	28	22	A4	ML–CL	L	26.0	21.2	17.1		1.89	4.1
							Wolfe Inlet N 46°53'43" W 64°08'56										
1B	30–78		100	100	98	98	62	45	A4	CL	SiC "	29.4	20.7	14.1	0.2	1.72	7.2
	78–140	0–5	100	100	98	94	46	22	A4	ML–CL	SiL	25.4	20.3	15.1	0.1	1.99	7.4
							Egmont N 46°38'00" W 64°20'35"										
1B	25–56		100	98	92	72	42	29	A7	CL	CL	38.3	24.0	18.6	0.1	1.88	7.2
	91–120	0–5	100	95	94	74	70	43	A7	CL	SiC	42.9	27.4	22.0	0.02	1.87	7.3

Table 25. Engineering test data for Prince Edward Island soil groups (continued)

Group number	(cm)	Sieve analysis					Fraction smaller		Classification			Liquid limit (%)	Plastic limit (%)	Shrinkage limit (%)	Hyd. Cond. (cm/h)	Bulk density (g/cm^3)	pH in $CaCl_2$
		Fraction 76 mm (%)	Passing sieve number (%)				5µ (%)	2µ (%)	AASHO[1]	Unif.[2]	USDA[3]						
			4	10	40	200											
Charlottetown N 46°17'24" W 63°20'49"																	
2A	23–58		95	94	88	44	20	11	A4	SM	FSL		N.P.		8.2	1.15	4.4
	58–100		83	80	77	38	22	13	A4	SM	FSL	20.2	18.4	18.2	0.4	1.71	4.8
Charlottetown N 46°13'34" W 63°11'04"																	
2A	46–71		88	75	70	38	24	16	A4	SM-SC	FSL	20.1	18.0	16.4	0.9	1.60	4.4
	71–100		76	72	58	40	33	19	A4	SM-SC	L	26.6	22.6	17.7	0.4	1.76	4.2
Charlottetown N 46°19'15" W 62°56'00"																	
2A	50–76		94	86	79	39	13	9	A4	SM	FSL		N.P.		3.1	1.67	5.2
	76–100		86	84	74	36	14	9	A4	SM	FSL		N.P.		1.3	1.79	4.4
Malpeque N 46°17'54" W 63°34'48"																	
2A	38–86		83	70	65	43	36	18	A4	ML	L	22.7	18.7	18.8		1.75	4.1
	86–100	0–10	85	75	69	40	35	16	A4	ML-SM	FSL	20.3	15.4	15.4		1.80	4.2
Winsloe N 46°20'27" W 62°36'07"																	
2A	24–76		96	91	83	44	23	11	A2-4	SM	FSL		N.P.		1.08	1.83	4.1
	76–100	0–10	95	91	84	45	25	13	A2-4	SM	FSL		N.P.	14.8	0.08	1.78	4.1
Alberry N 46°40'29" W 64°22'27"																	
2A	33–84		90	84	63	25	10	5	A2-4	SM	FSL		N.P.		5.6	1.54	5.0
	84–100	0–10	88	85	71	28	12	5	A2-4	SM	FSL		N.P.		4.6	1.62	5.0
Alberry N 46°14'38" W 62°37'00"																	
2A	61–100		83	74	63	24	12	5	A2-4	SM	GPSL		N.P.				4.6
	100–120	0–10	92	90	69	43	21	4	A4	SM	FSL	18.3	17.3	14.0			4.5
Alberry N 46°16'46" W 63°27'04"																	
2A	40–66		75	67	60	26	17	10	A2-4	SM	GPSL		N.P.		7.2	1.37	4.3
	66–132	0–20	52	46	43	17	15	8	A2-4	SW-SM	GPSL		N.P.		0.2	1.80	4.4
Alberry N 46°47'36" W 64°07'43"																	
2B	30–60		80	72	62	17	10	5	A2-4	SM	FSL		N.P.		1.60	1.54	4.3
	60–85	10–20	75	70	67	16	9	5	A2-4	SM	GSL		N.P.				4.3
	85+		Shattered sandstone bedrock														
Alberry N 46°07'36" W 62°40'39"																	
2B	38–51		85	54	42	17	16	11	A2-4	SM	GPSL		N.P.				4.5
	51–89	10–20	80	50	38	16	16	10	A2-4	SM	GPSL		N.P.		1.5	1.77	4.7
	89+		Conglomerate gravel bedrock														

Table 25. Engineering test data for Prince Edward Island soil groups (continued)

Group number	(cm)	Sieve analysis Fraction 76 mm (%)	Passing sieve number 4 (%)	10	40	200	Fraction smaller 5µ (%	2µ %)	Classification ASSHO^1	Unif.^{2}	USDA^3	Liquid limit (%)	Plastic limit (%)	Shrinkage limit (%)	Hyd. Cond. (cm/h)	Bulk density (g/cm^3)	pH in $CaCl_2$
Alberry N 46°03'58" W 62°43'33"																	
2B	51–69		79	70	53	18	12	7	A2-4	SM	GSL		N.P.				4.8
	69–97	10–20	76	73	56	18	11	7	A2-4	SM	GSL		N.P.				4.5
	97+		Conglomerate sandstone bedrock														
Haliburton Brook N 47°00'16" W 64°01'36"																	
3A	36–96		100	99	92	50	20	10	A2-4	SM	FSL		N.P.		3.4	1.73	6.0
	96–117	0–5	95	86	77	29	15	9	A2-4	SM	FSL		N.P.		0.9	1.68	6.3
Salt Grass Point N 46°32'04" W 64°03'33"																	
3A	23–53		100	94	91	39	21	15	A2-4	SM	FSL					1.80	7.5
	53–100	0–10	100	93	85	36	19	13	A2-4	SM	FSL	19.2	16.4	13.4	0.02	1.20	7.6
Mossy Point N 46°37'48" W 64°20'57"																	
3A	35–51		91	78	62	11	15	8	A2-4	SW-SM	GFSL		N.P.				6.0
	51–100	0–5	92	86	73	13	12	7	A2-4	SM	FSL		N.P.				7.0
Kildare N 46°38'59" W 64°28'48"																	
3A	38–100		84	79	66	18	9	5	A2-4	SM	LS		N.P.		7.5	1.55	4.8
	100–125	0–5	85	81	69	9	3	1	A3	SW-SM	S		N.P.		8.6	1.52	5.1
Dunblane N 46°38'30" W 64°17'04"																	
3B	75–100			100	99	87	37	18	A4	ML	SiL	23.3	21.2	19.9	0.1	1.58	3.9
	100–120	0			100	89	37	16	A4	ML-CL	SiL	26.8	20.9	21.9	0.1	1.60	
West Point N 46°38'18" W 64°17'08"																	
3B	36–60		99	94	92	76	36	18	A4	ML-CL	SiL	22.3	17.2	14.4	0.3	1.82	6.2
	60–100	0	99	94	93	81	35	13	A4	ML	SiL	21.6	18.6	17.9	0.1	1.80	7.0
Baptist Point N 46°36'20" W 64°16'32"																	
3B	25–38		100	99	97	79	36	16	A4	ML-CL	SiL	22.2	17.9	5.9	0.5	1.82	4.0
	38–100	0	100	99	96	75	31	16	A4	ML-CL	SiL	21.5	16.1	7.3	0.2		5.3
Locke Road N 46°38'02" W 64°37'46"																	
3B	60–100			100	99	91	49	28	A6	CL	SiL	33.3	22.6	17.0			5.7
	100–120	0		100	99	93	47	24	A6	CL	SiL	32.0	22.9	18.1			5.7
Dunstaffnage N 46°18'41" W 63°03'08"																	
4	59–90		100	99	34	6	3	0	A3	SW-SM	S		N.P.				
	90–120	0–50	100	99	27	7	3	0	A3	SW-SM	S		N.P.				

Table 25. Engineering test data for Prince Edward Island soil groups (concluded)

Group number	(cm)	Sieve analysis					Fraction smaller		Classification			Liquid limit (%)	Plastic limit (%)	Shrinkage limit (%)	Hyd. Cond. (cm/h)	Bulk density (g/cm^3)	pH in CaCl$_2$
		Fraction 76 mm (%)	Passing sieve number (%) 4	10	40	200	5µ (%)	2µ (%)	ASSHO[1]	Unif.[2]	USDA[3]						
							Bunbury N 46°13'34" W 62°40'53"										
4	66–85		66	62	48	25	3	0	A2–4	SM	LFS		*N.P.		3.1	1.55	4.8
	85–100	0–20	78	66	51	30	2	0	A2–4	SM	LFS		N.P.		8.6	1.63	5.5
							Culloden N 46°22'20" W 62°50'42"										
4	33–61			100	96	33	5	2	A2–4	SM	FS		N.P.			1.32	4.1
	61–100	0–20	89	88	79	32	14	8	A2–4	SM	SL		N.P.			1.92	4.1
							Uigg N 46°19'27" W 62°40'36"										
4	30–66		85	76	58	10	5	3	A2–4	SW-SM	LS		N.P.		13.2	1.54	5.2
	66–91	0–10	75	70	59	18	10	4	A2–4	SW	LS		N.P.		0.4	1.90	5.7
							Wood Island N 46°40'00" W 64°00'20"										
4	60–81		95	92	84	33	16	10	A2–4	SM	FSL		N.P.		0.02		
	81–152	0–5	90	87	78	26	13	8	A2–4	SM	FSL		N.P.		0.2		
							Newton N 46°08'27" W 62°40'36"										
4	59–127			100	98	86	38	18	A4	SM	SiL						3.9
	127–150	0–5	95	95	94	91	48	25	A4	ML	SiL				0.01	1.71	3.8
							Orwell N 46°19'36" W 62°56'00"										
4	48–90		80	79	73	47	23	8	A4	SM	L		N.P.		0.3	1.84	4.7
	90–120	0–5	96	90	80	41	18	8	A4	SM	FSL		N.P.		0.2	1.97	5.0

[1] American Association of State Highway Officials
[2] The United Soil Classification System
[3] United States Department of Agriculture
*N.P. = nonplastic

Table 26. Engineering interpretations of soil for some uses

Map unit or name (symbol and drainage)	Eng. group number	Parent material slope range; estimated depth of material	Soil suitability for			Soil features affecting		
			topsoil	sand gravel	road fill	Shallow excavations	Agricultural drainage	Off-road trafficability
Abney Road (Ab) (very poor)	5B	Organic soil; level; less than 1.5 m deep	unsuited	unsuited	unsuited	avoid for trenches, excavations	control of water table but unsuited for this use	poor, permanently wet, soft surface
Alberry (Al) (well)	2A	Sandy glacial till; slopes 0-30%; less than 2 m deep	good	unsuited	good	no problems	not needed	no limitations other than slopes
Alberry bedrock phase (Ald) (well)	2B	Same as above except for regolith or consolidated bedrock less than 1 m from the soil surface	good	unsuited	good	bedrock usually is rippable with light machinery	not needed	as above
Arlington (Ar) (very poor)	5A	Organic soil; gently domed; deep, 1 to 5 m	unsuited	unsuited	unsuited	avoid if possible	drainage and water table control, may be economically feasible in some areas	poor, permanently wet, soft surface
Baptist Point (Bp) (poor and very poor)	3B	Silty glaciomarine; level; variable depth	poor	unsuited	poor	excavations require water control and wall support, low bearing and quick conditions exist	lowering of water table, low subsoil transmissibility	poor, high water table, low bearing capacity
Brackly (Br) (imperfect)	2A	Sandy overwash overlying glacial till; slopes 0-9%; less than 1 m overwash material	fair	unsuited	good	no problems, some seepage and upper wall support may be necessary in wet periods	surface drainage required	fair, periodic perched water table
Bunburry (Bu) (well)	4A	Glaciofluvial gravelly loamy sands; slopes 0-30%, variable depth	fair	fair	good	no problems, ortstein horizon easily shattered	not needed	no limitations other than slopes
Canavoy (Ca) (very poor)	5B	Organic soil; level; less than 1.5 m deep	unsuited	unsuited	unsuited	avoid	lowering of water table but unsuited for this use	poor, permanently wet, soft surface
Carey Point (Cp) (imperfect)	3A	Glaciomarine, gravelly loamy sands; level; variable depth	poor	fair to unsuited	fair	water control and wall support may be necessary	control of water table	fair to poor, periodic high water table

Table 26. Engineering interpretations of soil for some uses (continued)

Map unit or name (symbol and drainage)	Eng. group number	Parent material slope range; estimated depth of material	Soil suitability for			Soil features affecting		
			topsoil	sand gravel	road fill	Shallow excavations	Agricultural drainage	Off-road trafficability
Charlottetown (Ch) (well)	2A	Fine sandy loam glacial till; slopes 0-30%; generally less than 2 m	good	unsuited	good	no problems	not needed	no limitations other than slopes
Charlottetown bedrock phase (Chd) (well)	2B	As above except for regolith or bedrock less than 1 m from the soil surface	good	unsuited	good	bedrock usually is rippable with light machinery	not needed	same as above
Coastal Beach (Cb) (variable)	6	Sand, minor gravel; variable depth	unsuited	variable	unsuited	water control and wall support required	not used for agriculture	poor, wetness and inundation
Crapaud (Cr) (imperfect)	2A	Sandy glacial till; slopes 0-5%; less than 2 m	fair	unsuited	good	water control and some upper wall support may be required	tile drainage beneficial	periodic wetness
Culloden (Cu) (well)	4	Glaciofluvial gravelly loamy sands; slopes 0-30%; variable depth	fair	fair to unsuited	good	no problems	not needed	no limitations other than slopes
Dunblane (Db) (moderately well)	3B	Silty glaciomarine; slopes 0-5%; variable depth	good	unsuited	fair	no problems	tile drainage may be beneficial to lengthen growing season	good to fair
Dune Sand (Ds) (variable)	6	Windblown sand deposits; slopes 0-30%; variable depth	unsuited	good	fair	wall support required, variable water table depth	not used for agriculture	variable loose sand except where stabilized or strongly vegetated
Dunstaffnage (Df) (well)	4	Glaciofluvial gravels, sands, sandy loams; slopes 0-30%; variable depth	fair	fair to unsuited	good	no problems, coarse fragment may interfere	not needed	no limitations other than slopes
Duvar (Du) (imperfect)	1A	Loam glacial till; slopes 0-15%; less than 2 m over regolith	poor	unsuited	fair	water control	surface drainage required, slow permeability	fair to poor perched water table, slippery
Egmont (Eg) (poor and very poor)	1B	Clay loam glacial till; slopes 0-9%; less than 2 m	poor	unsuited	poor	water control required	surface drainage required, very slow permeability	poor perched water table, slippery

Table 26. Engineering interpretations of soil for some uses (continued)

Map unit or name (symbol and drainage)	Eng. group number	Parent material slope range; estimated depth of material	Soil suitability for			Soil features affecting		
			topsoil	sand gravel	road fill	Shallow excavations	Agricultural drainage	Off-road trafficability
Enmore (En) (very poor)	5B	Organic soil; level; less than 1.5 m	unsuited	unsuited	unsuited	avoid	lowering of water table but unsuited for this use	poor, permanently wet soft surface
Fifteen Point (Fp) (moderately well)	1B	Loam glacial till; slopes 0-15%; less than 2 m	fair	unsuited	fair	no problems	tile drainage may be beneficial to lengthen growing season	fair, slippery when wet
Gowanbrae (Go) (well)	2A	Sandy overwash overlying glacial till; slopes 0-30%; less than 1 m	fair	unsuited	good	no problems	not needed	no limitations
Haliburton (Ha) (well)	3A	Fine sandy loam glaciomarine slopes 0-15%; variable depth	good	unsuited	good	no problems	not needed	no limitations other than slopes
Haliburton (Hab) (moderately well)	3A	As above	good	unsuited	good	no problems	tile drainage to lengthen growing season	good to fair, periodic wetness
Hazelbrook (Hz) (very poor)	5B	Organic soil; level; less than 1.5 m	unsuited	unsuited	unsuited	avoid	lowering of water table but unsuited for this use	poor, permanently wet, soft surface
Hebron (He) (imperfect)	4	Silty glaciofluvial; slopes 0-9%; variable depth	fair	unsuited	fair	water control during wet periods	surface drainage required	fair, perched or periodic wetness
Kildare (Ki) (well)	3A	Gravelly sands, loamy sand glaciomarine; slopes 0-30%; variable depth	fair	fair to unsuited	good	no problems, some wall support required	not needed	no limitation other than slopes
Lake Verde (Ve) (very poor)	5B	Organic soil; level; less than 1.5 m	unsuited	unsuited	unsuited	avoid	lowering of water table but unsuited for this use	poor, permanently wet, soft surface
Locke Road (Lr) (poor and very poor)	3B	Silty loam glaciomarine; level; variable depth	poor	unsuited	poor	water control and wall support required	surface drainage, slow subsoil permeability, high water table	poor, high water table, slippery

Table 26. Engineering interpretations of soil for some uses (continued)

Map unit or name (symbol and drainage)	Eng. group number	Parent material slope range; estimated depth of material	Soil suitability for			Soil features affecting		
			topsoil	sand gravel	road fill	Shallow excavations	Agricultural drainage	Off-road trafficability
Malpeque (Ma) (imperfect)	2A	Fine sandy loam glacial till; slopes 0-15%; less than 2 m	good	unsuited	fair	water control during wet periods	surface drainage required; slow permeability but tile drainage may be suitable for some areas	fair, periodic perched water table
Margate (Mg) (poor)	1A	Loam glacial till; slopes 0-5%; less than 2 m	poor	unsuited	poor	water control necessary	surface drainage required, slow permeability	poor, perched water table
Mossy Point (Mp) (poor and very poor)	3A	Glaciomarine gravels, sands, minor silts; level; variable depth	unsuited	unsuited	poor	excavations require water control and wall support	lower water table	poor, high water table, low bearing capacity
Munn Road (Mr) (imperfect)	3B	Silty glaciomarine; slopes 0-9%; variable depth	fair	unsuited	fair	water control and wall support may be required	surface drainage required	fair, periodic wetness
Newton (Ne) (well)	4	Silty glaciofluvial; slopes 0-15%; variable depths	good	unsuited	good	no problems	not required tile drainage may be beneficial for some areas	no limitations
O'Leary (Ol) (moderately well)	1A	Loam glacial till; slopes 0-30%; less than 2 m	fair	unsuited	fair	no problems	surface drainage required	good to fair, periodic wetness
Orwell (Or) (poor and very poor)	4	Silty glaciofluvial; slopes 0-5%; variable depths	poor	unsuited	poor	water control and upper wall support	high water table	poor, high water table
Pisquid (Pi) (very poor)	5B	Organic soil; level; less than 1.5 m deep	unsuited	unsuited	unsuited	avoid	lower water table but unsuited for this purpose	poor, permanently wet, soft surface
Pownal (Po) (very poor)	5A	Organic soil; level; 1-3 m deep	unsuited	unsuited	unsuited	avoid	lower or control water table; development of some areas may be feasible	poor, permanently wet, soft surface
Salt Grass Point (Sp) (imperfect)	3A	Sandy loam glaciomarine and non-compact till; slopes 0-15%; variable depth	fair	unsuited	fair	water control and some wall support may be required	lower seasonal water table; tile drainage may be beneficial in some areas	fair, periodic high water table

Table 26. Engineering interpretations of soil for some uses (concluded)

Map unit or name (symbol and drainage)	Eng. group number	Parent material slope range; estimated depth of material	Soil suitability for			Soil features affecting		
			topsoil	sand gravel	road fill	Shallow excavations	Agricultural drainage	Off-road trafficability
Salt Marsh (Sm) (very poor)	6	Mixed mineral-organic tidal deposits	unsuited	unsuited	poor	water control and wall support required	unsuited for this use	poor, wet soft surface
Stream Complex (Sc) (dominantly poor)	6	Ribbon stream channel and bank deposits	poor	unsuited	poor	water control and wall support required	unsuited for this use	poor, wetness and inundation
Tignish (Ti) (well)	1A	Loam glacial till; slopes 0-30%; less than 2 m	good	unsuited	fair	no problems	not required	good, dense subsoil
Uigg (Ui) (imperfect)	4	Glaciofluvial sands; gravelly loamy sands; slopes 0-9%; variable depth	fair	unsuited	fair	water control and wall support required	lower water table; tile drainage may be beneficial	fair, seasonal high water table
West Point (Wp) (imperfect)	3B	Silty glaciomarine; level; variable depth	fair	unsuited	fair	water control and wall support may be required	surface drainage	fair, seasonal high water table
Winsloe (Wn) (poor and very poor)	2A	Fine sandy loam glacial till; 0-5% slopes less than 2 m	poor	unsuited	poor	water control and some wall support	surface drainage	poor, high water table, dense subsoil
Wolfe Inlet (Wf) (imperfect)	1B	Loam glacial till; slopes 0-9%; variable depth	fair	unsuited	fair	water control in wet periods	surface drainage	fair, seasonal high water table
Wood Island (Wi) (poor)	4	Glaciofluvial gravels, sands, loamy sands; slopes 0-9%; variable depth	poor	unsuited	fair	water control required	surface drainage	fair, seasonal high water table

The soils occur on gently to moderately undulating topography. The more level and depressional areas are occupied by imperfectly drained soils with seasonal water tables within 100 cm depth and poorly drained soils with water tables near the soil surface. Occasionally they are occupied by organic deposits.

The soil material is suitable for borrow or fill, excavation is easy, and walls stand with minimal support. Good foundation conditions can be expected on well-drained soils or when adequate surface drainage is provided. The soils are not suitable for septic filter fields without modification because of very slow subsoil permeability or perched water tables. If used for this purpose extra soil should be added to the surface. Gravel and cobble content of the till is low. Trafficability problems are common for the poorly drained soils and can develop on all soils during wet weather construction because B horizons are somewhat plastic.

Engineering Group 2: Soils associated with loamy sand to fine sandy loam glacial till, generally less than 2 m thick over regolith or bedrock

Soils in this group have formed on non-plastic to slightly plastic glacial till. They are lower in silt clay content than the soils in Engineering Group 1. Two subgroups are arbitrarily identified on the basis of depth to bedrock or regolith, as indicated in Table 24. The bedrock may be weakly or quite strongly consolidated sandstone or sandstone-shale or occasionally mixed conglomerate, but it is thinly bedded and normally can be excavated with light equipment.

The soils occupy gently undulating to rolling ridges and hills. The soils are non-stony but have low to moderate amounts of gravel and cobble size fragments.

The well-graded nature of the till material is well suited for use as borrow or fill. Excellent foundation characteristics can be expected for well-drained soils. Imperfectly and poorly drained soils may have perched or permanent high water tables with associated problems of seepage and groundwater control during construction. Most of the glacial till is compact ground moraine that is characteristically dense with low water content, high shear resistance, and low compressibility. The soils range from adequate to poor locations for septic filter fields, depending on soil profile drainage or wetness, subsoil permeability, and slope. Site modifications with extra soil filter added is frequently necessary because of slow and sometimes erratic subsoil permeability or high water table for the imperfectly and poorly drained soils.

Although the glacial till is a poor source of aggregate, a few scattered deposits of gravelly conglomerate bedrock strata underlie the till at variable depths. These deposits provide the island with some of its gravel requirements. The gravel conglomerate can be mined where weathering has dissolved some of the calcareous cement. The gravel is variable in size and consists of well-rounded and disc-shaped hard igneous and metamorphic material. Most workable deposits are lenticular, rather small, covered by a till mantle, and usually require screening to remove included fines.

Engineering Group 3: Soils associated with glaciomarine deposits and non-compact tills

Soils included in this group have formed on relatively thin, sporadic, and irregular deposits of gravel, sand, silt, and minor clay. The soils occupy a coastal ribbon complex of subdivided level to gently undulating, well to poorly defined terraces and raised beaches. They more or less parallel the contours of the land up to the 22 m contour in western Prince County but diminish to zero in an easterly direction east of Summerside.

Subgroup 3A contains much soft pebble and cobble sandstone with variable proportions of harder calcareous sandstone, breccia, and foreign, or off-the-island, particles. Where the deposits are deeper and more wave washed the gravel has been extracted with crushing and screening. Most of the easily available deposits have been exhausted. Subgroup 3A consists of gravelly sand, loamy sand, and sandy loam. Subgroup 3B consists of loam and clay loam materials with minor gravel and sand layers. The deposits fringe the coast and vary widely in degree of stratification, depth, and drainage. The differentiation of soil map units is based primarily on parent material textures and soil drainage. Modified tills that were judged to be non-compact were included with the group. Field separations were tenuous and engineering evaluations are limited in scope and reliability because of the variability of deposits over short distances.

All poorly drained soils have water tables continuously at or near the ground surface. They provide poor support for vehicular traffic. If used for construction, fill is necessary to raise foundations about the water table. Subgroup 3B soils with poor drainage have medium to high compressibility and poor shear strength.

Engineering Group 4: Soils associated with glaciofluvial deposits

The soil materials that comprise the glaciofluvial deposits are dominantly distinguished by the sorting of the particles present. In Prince Edward Island the soft character of the bedrock makes it susceptible to alteration and abrasion. The distinction between stratified drift on the one hand and glacial till or till-regolith on the other is not always clear-cut or distinctive in the field. Till grades into stratified drift and frequently both are thin over regolith. Many exposures that contain varying proportions of both materials have been included in the glaciofluvial complex. In many instances the coarse texture of the material was a factor in the decision.

Dunstaffnage soils occupy hummocky terrain composed of coarse textured esker and kame materials, which include gravelly or cobbly ablation moraine and cobbly ground moraine. They have rapid permeabilities and in general are droughty for agricultural crops. Culloden and Bunbury soils have formed on less coarse glaciofluvial complex and have been delineated with little recognition of local topographic form whether esker, kame, valley-edge kame, or other kind of ice-contact deposit. Soil materials vary in thickness over till or regolith and within deposits there may be wide variations in grain size. The Bunbury soils are well drained with rapid permeabilities except where underlying till or silty regolith occurs within 1 m of the soil surface or influences the moisture regime and permeability. The Uigg and Wood Island soils have developed on similar material but have imperfect and poor drainage, respectively, with water tables near the soil surface for much of the year.

The Newton, Hebron, and Orwell soils have developed on fine sandy to silty glaciofluvial or modified materials. They are well, imperfectly, and poorly drained, respectively. Less than 300 ha of Newton and Hebron soils have been mapped. Delineations are small and usually shallow or less than 1 m in depth.

The esker deposits on the island are small features, commonly less than 1-2 km in dimension. None of the glaciofluvial deposits consist of very resistant rock types or strong gravelly material. Locally the sands and gravels are exploited for road construction fill because better-quality gravel is either mined from the conglomerate bedrock or imported.

The well-drained soils of the group, with the exception of Newton, have rapid permeabilities and normally are suitable for septic filter field installations. The materials are well suited for borrow or fill and provide excellent foundation characteristics.

Engineering Group 5: Soils associated with organic deposits

The organic soils in Prince Edward Island have been subdivided into 5A and 5B, mainly on the basis of thickness and kind of deposit. Subgroup 5A is represented by peat deposits derived dominantly from sphagnum moss and generally they are more than 1 m thick, with the exception of some areas of the Pisquid association. The organic soils in subgroup 5B are generally less than 1.5 m thick and represent more variable peat materials.

Organic soils should be avoided whenever possible because they present problems for construction. If the land must be used, whenever feasible the organic material should be excavated and replaced with mineral material. Alternatively, the peat should be replaced by road fill or, if the bog is deep, by the flotation method.

Engineering Group 6: Miscellaneous soil and land types associated with recent deposits

Engineering data are not available for these soils. They are briefly discussed in the section Description of the soils, and reference can be made to this decription for an estimate of properties.

SOILS AND COMMUNITY DEVELOPMENT

Land use planning is an increasingly important aspect of man's activities. In selecting soils for various kinds of nonfarm use or urban development, their suitability should be considered to enable best choice and avoid mistakes that result in waste and unnecessary loss of valuable agricultural land.

This section presents interpretations of the soils of the province for waste disposal by septic filter field, housing, area-type sanitary landfill, and recreation. Such interpretations allow selection from a soil map of sites that have the least limitations for the above uses.

Soil limitation ratings for septic filter fields

A septic filter field is designed to dispose of effluent and sewage by soil absorption. The system is designed to distribute sewage effluent uniformly through the natural soil medium by a subsurface tile system. In Table 28 the soils are rated according to their abilities to adsorb and filter the effluent. The major soil properties affecting the movement of effluent from such a field system is the permeability of the soil at and below the depth of the tile line and slope. Other criteria used for rating the soils are associated with either construction and maintenance or the prevention of contamination of water supplies, streams, rivers, and lakes. The major properties considered are depth to bedrock, stoniness, slope, permeability, depth to seasonal high water table, and flooding hazard.

See Table 27 for criteria used in rating soils, and Table 28 for soil interpretations for septic filter field.

Soil limitation ratings for housing

The soils limitation ratings given in Table 30 are for single family dwellings and other structures with similar foundation requirements (buildings of three stories or less). The soils are rated for buildings with basements but for buildings without basements criteria are noted in Table 29. Standard construction practices are assumed, such as dampproofing and installation of foundation drains. The emphasis in rating soils for housing is placed on the properties that affect suitability for foundations. Properties influencing the ease or difficulty of excavation and construction are evaluated for both the building and the installation of utlity lines. Excluded from the ratings for housing are soil suitability for septic filter fields, access roads, water supply potential, and location desirability factors. On-site investigations are necessary for specific placement of buildings and utility lines as well as detailed design of foundations. Soil properties that affect the rating are those related to capacity to support load and resist settlement under that load, and those that relate to ease of excavation. Soil wetness, flooding, plasticity and texture, shrink-swell potential, and potential frost action affect the ability of the soil to support load. Those that affect excavation are wetness, slope, depth to bedrock, and stoniness. Criteria used in rating the soil limitations for housing are given in Table 29.

Table 27. Soil limitations for septic filter fields[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Permeability[2] (subsoil) (cm/h)	greater than 2.0 but less than 12[3]	2.0-0.5	less than 0.5 or greater than 12
Depth to seasonal high groundwater table[4] (m) (soil drainage class)	greater than 1.5 (rapidly drained[5])	1.5-5 (well and moderately well drained)	less than 0.5 (imperfectly and poorly drained)
Depth to bedrock[6] (m)	greater than 1.5	1.5-1	less than 1
Slope[5] (%)	less than 9	9-15	15-30
Flooding hazard	not subject to flooding	this rating is not used	subject to flooding (flooding once in 5 years or less frequently)
Surface stoniness	surface stones are relatively nonexistent		

A fourth degree of soil limitations is also defined for septic tanks:

Unsuitable:
- Slopes greater than 30%
- Permeability greater than 25 cm/h
- Flooding more than once in 5 years
- Depth to bedrock less than 50 cm
- Organic soils
- Permanently wet

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[1] Limitation based on (1) Rose, R.D., et al. 1969. Use of Soils in the Fourteen-County Appalachia Region of New York State. Agronomy Mimeo 69-5, Department of Agronomy, Cornell University; (2) U.S. Dept. of Agric., Soil Conservation Service. 1971. Guide for Interpreting Engineering Uses of Soils. Soils Memorandum SCS-45 (Rev. 2); and (3) Coen, G.M., and W.D. Holland. 1976. Soils of Waterton Lakes National Park, Alberta. Alberta Institute of Pedology, Information Report NOR-X-65.

[2] This rating refers to the permeability of the subsoil (as determined by the constant head method, using core samples) at and below the depth of the tile line.

[3] Soils with permeability rates greater than 12 cm/h are considered possible groundwater pollution hazards.

[4] The depth to the seasonal high water table should be at least 1.0 m below the depth of the tile (which is assumed to be at a depth of at least 0.5 m.). Although the presence of a high groundwater table level, either continuous (true) or perched, is a serious problem to the functional operation of a septic tank, the continuous water table also presents the hazard of polluting the groundwater. Perched water tables do not pose this problem and can be rated more leniently.

[5] The bedrock, being a rippable sandstone, tends to be permeable in the upper 0.5-1 m but may be erratic and very slowly permeable below. Water pollution hazard should be site-evaluated before installation.

Table 28. Soil limitations for septic filter fields

Map unit and soil phase[1]; numerator part of map symbol		Degree of limitation[2] with indicated slope classes				Major soil property[3] other than slope influencing limitations and use
		B, C, D 0-9%	E,I 9-15%	F,J 15-30%	G over 30%	
Abney Road	Ab	U				organic soil
Alberry	Al	Sl-M	M	S	U	shallow till depth and
	Ald	M-S	M-S	S	U	erratic permeabilities in bedrock materials
Arlington	Ar	U				organic soil
Baptist Point	Bp	U				permanently wet
Brackley	Br	S	S			permeability, seasonal wetness
Bunbury	Bu	Sl-M	M	S	U	permeability, (ortstein horizon)
Canavoy	Ca	U				organic soil
Carey Point	Cp	S				seasonal groundwater table
Charlottetown	Ch	M-S	M-S	S	U	permeability usually
	Chd	M-S	M-S	S	U	less than 0.5 cm/h, erratic in bedrock materials
Crapaud	Cr	S	S			seasonal water table
Culloden	Cu	Sl	M	S	U	
	Cud	M-S	M-S	S	U	erratic permeability
Dunblane	Db	S				permeability less than 0.5 cm/h
Dunstaffnage	Df	Sl-S	M-S	S	U	erratic permeability, pollution hazard possible
Duvar	Du	S	S			seasonal water table, permeability
Egmont	Eg	S-U				seasonal water table, permeability
Emyvale	Em	M-S	M-S	S	U	bedrock, pollution hazard possible
Enmore	En	U				organic soil
Fifteen Point	Fp	S	S			permeability less than 0.5 cm/h
Frenchfort	Fr	U				organic soil
Gowanbrae	Go	Sl-S	M-S	S		permeability
Haliburton	Ha	Sl	M	S	U	
Haliburton Brook	Hab	M				seasonal water table
Hazelbrook	Hz	U				organic soil
Hebron	He	S	S			permeability, seasonal water table
Kildare	Ki	Sl	M	S	U	
Lake Verde	Ve	U				organic soil
Locke Road	Lr	U				permeability, wetness
Malpeque	Ma	S	S	S		permeability, seasonal water table
Margate	Mg	S-U				permeability, seasonal water table
Mossy Point	Mp	U				permeability, wetness
Munn Road	Mr	S				permeability
Newton	Ne	S	S			permeability
O'Leary	Ol	S	S	S		permeability
Orwell	Or	U				permanently wet
Pisquid	Pi	U				organic soil
Pownal	Po	U				organic soil

Table 28. Soil limitations for septic filter fields (concluded)

Map unit and soil phase[1]; numerator part of map symbol		Degree of limitation[2] with indicated slope classes				Major soil property[3] other than slope influencing limitations and use
		B, C, D 0-9%	E,I 9-15%	F,J 15-30%	G over 30%	
Rocky Point	Rp	U				permanently wet
Salt Grass Point	Sp	S				seasonal water table
Tignish	Ti	S				permeability
Uigg	Ui	S				seasonal water table
West Point	Wp	S				seasonal water table, permeability
Winsloe	Wn	S-U				seasonal water table, permeability
Wolfe Inlet	Wf	S				permeability, seasonal water table
Wood Island	Wi	S-U				seasonal water table
Land Types				Not classified		

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[1] Unlisted phases are included with the modal soil; they may affect interpretations.

[2] Degree of limitation; Sl-slight; M-moderate; S-severe; U-unsuitable.

[3] Nature of limitation is from Table 27.

Soil limitation ratings for area-type sanitary landfill

In area-type sanitary landfill, each successive layer of refuse deposit is covered by about 15 cm of soil until successive layers of soil and waste are built up to ultimate thickness. The final cover of about 50 cm of soil material is placed over the fill. The disposal area should be operated in such a way as to minimize any offensiveness, such as smoke, odor, appearance, and pollution hazard.

The features considered in rating soils are predominantly associated with pollution hazard. Careful evaluation of site hydrology before depositing landfill is essential. Should pollution problems arise it would not be practical to remove the refuse or install barriers because of the size and character of the landfill.

Landfill areas are subject to heavy vehicular traffic and soil properties that affect trafficability are important.

Criteria used in rating soils for area-type sanitary landfill are shown in Table 31. The ratings in Table 32 show that all soils have moderate or more severe limitation for this use.

Soil limitation ratings for recreation

This section is designed to assist users or planners to determine the limitations or suitability of the various soils for recreational development. Recreation has been divided into (1) soil limitations for athletic fields, and (2) soil limitations for outdoor living. Each division is discussed separately and two corresponding limitation guides have been established.

(1) Soil limitations for athletic fields

These ratings apply to soils to be used intensively for schools and for community atheletic and sport fields. These areas are subjected to heavy foot traffic and are expected to be nearly level. The interpretation applies to soils in their natural condition with minimal reshaping of the site or drainage improvement required. The possible need to haul in fill or topsoil is not considered in this rating, but probably seeding and fertilizing are considered. The soil criteria used in the rating are those that affect (1) construction - depth to water table, slope, depth to bedrock, and surface coarse fragments; (2) use - depth to water table, permeability, and flooding; (3) maintenance - permeability, flooding, available moisture, surface texture, and susceptibility to frost action. Criteria used in rating soil limitations for athletic fields are indicated in Table 33, and the ratings are listed in Table 35.

(2) Soil limitations for outdoor living

These ratings apply to those soils that are to be used rather intensively for tent, trailer, or picnic campsites and for paths and trails. Except for some grading, surface clearing, or cleaning, little is disturbed. Problems of

Table 29. Soil limitations for housing[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Depth to seasonal high water table (m) (soil drainage class)			
With basement	greater than 1.2 m (well and rapidly drained)[2]	1.2-0.5 m (moderately well drained)	less than 0.5 m (imperfectly and poorly drained)
Without basement	greater than 0.5 m (rapidly, well, and moderately well drained)	0.5-0.2 m (imperfectly drained)	less than 012 m (poorly drained)
Slope[2] (%)	0-9	9-15	15-30
Depth to bedrock[3] (m)			
With basement	greater than 1 m	less than 1 m	this rating not used
Without basement	greater than 0.5 m	less than 0.5 m	this rating not used
Flood hazard	no flooding	no flooding	subject to flooding (floods once in 20 years or less frequently)
Unified soil group[4]	GW, GP, SW, SP, GM, GC, SM, SC, CL (PI,[5] less than 15)	ML, CL (PI,[5] greater than 15)	CH, MH, OL, OH

Table 29. Soil limitations for housing[1] - guideline criteria (concluded)

Major soil properties influencing uses	Degree of limitation		
	Low	Moderate	High
Potential frost action[6]			
Well and imperfectly drained	GW, GP, SW, SP	GM, GC, SM, CL, SC	ML, MH
Poorly drained	GW, GP	SW, SP, GC, CL	GM, SM, SC, ML, MH
Surface stoniness	stoniness is not a factor on soils in the province		
Shrink-swell potential[7]	With the exception of Fifteen Point and Locke Road Map Units, which have a moderate shrink-swell potential, this factor is of slight to no limitation for soils in the survey area.		

A fourth degree of soil limitation is also defined for housing:

Unsuitable:
- Slopes greater than 30%
- Permanently wet soils
- Flooding more than once in 20 years
- Organic soil

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[1] Limitation based on (1) Rose, R.D., et al. 1969. Use of Soils in the Fourteen-County Appalachia Region of New York State. Agronomy Mimeo 69-5, Department of Agronomy, Cornell University; (2) U.S. Dept. of Agric., Soil Conservation Service. 1971. Guide for Interpreting Engineering Uses of Soils. Soils Memorandum SCS-45 (Rev. 2); and (3) Coen, G.M., and W.D. Holland. 1976. Soils of Waterton Lakes National Park, Alberta. Alberta Institute of Pedology, Information Report NOR-X-65.

[2] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dep. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[3] Because the bedrock throughout the survey area is a soft, rippable sandstone it has only a moderate influence on excavation and construction costs for buildings or for installation of utility lines. Where it is very rippable the influence is slight to none.

[4] This item estimates the soil's ability to withstand applied loads.

[5] PI means plasticity index.

[6] Potential frost action is based on the Guide for Interpreting Engineering Uses of Soils. U.S. Dept. of Agric. Soil Conservation Service. 1976. Soils Memorandum SCS-45 (Rev. ed.). However, it has been slightly modified. Proper house construction should include preventative measures to reduce or eliminate most frost heaving.

[7] The shrink-swell potential is based on plasticity index ranges as established by Coen, G.M., and W.D. Holland. 1976. Soils of Waterton Lakes National Park, Alberta. Alberta Institute of Pedology, Information Report NOR-X-65.

Table 30. Soil limitations for buildings with basements

Map unit and soil phase[1]; numerator part of map symbol		Degree of limitation[2] with indicated slope classes B, C, D 0-9%	E,I 9-15%	F,J 15-30%	G over 30%	Major soil property[3] other than slope influencing limitations and use
Abney Road	Ab	U				organic soil
Alberry	Al	Sl	M	S	U	
	Ald	Sl-M	M	S	U	bedrock usually rippable
Arlington	Ar	U				organic soil
Baptist Point	Bp	U				permanently wet soil
Brackley	Br	S	S			seasonal high water table
Bunburry	Bu	Sl	M	S	U	
Canavoy	Ca	U				organic soil
Carey Point	Cp	S				seasonal high water table
Charlottetown	Ch	Sl	M	S	U	
	Chd	Sl-M	M	S	U	bedrock usually rippable
Crapaud	Cr	S	S			seasonal high water table
Culloden	Cu	Sl	M	S	U	
	Cud	Sl-M	M	S	U	bedrock usually rippable
Dunblane	Db	Sl				
Dunstaffnage	Df	Sl	M	S	U	
Duvar	Du	S	S			seasonal high water table
Egmont	Eg	S	S			seasonal high water table
Emyvale	Em	M	M	S	U	bedrock usually rippable
Enmore	En	U				organic soil
Fifteen Point	Fp	Sl	M	S		
Frenchfort	Fr	U				organic soil
Gowanbrae	Go	Sl	M	S		
Haliburton	Ha	Sl	M	S	U	
Haliburton Brook	Hab	M				seasonal high water table
Hazelbrook	Hz	U				organic soil
Hebron	He	S				seasonal high water table
Kildare	Ki	Sl	M	S	U	
Lake Verde	Ve	U				organic soil
Locke Road	Lr	U				permanently wet soil
Malpeque	Ma	S	S	S		seasonal high water table
Margate	Mg	S	S	S		seasonal high water table
Mossy Point	Mp	U				permanently wet soil
Munn Road	Mr	S	S	S		seasonal high water table
Newton	Ne	Sl	M	S	U	
O'Leary	Ol	M	M	S		seasonal water table
Orwell	Or	S				permanently wet
Pisquid	Pi	U				organic soil
Pownal	Po	U				organic soil
Rocky Point	Rp	U				permanently wet soil

Table 30. Soil limitations for buildings with basements (concluded)

Map unit and soil phase[1]; numerator part of map symbol		Degree of limitation[2] with indicated slope classes				Major soil property[3] other than slope influencing limitations and use
		B, C, D 0-9%	E,I 9-15%	F,J 15-30%	G over 30%	
Salt Grass Point	Sp	S				seasonal high water table
Tignish	Ti	Sl	M	S	U	
Uigg	Ui	S	S			seasonal high water table
West Point	Wp	S				seasonal high water table
Winsloe	Wn	S				seasonal high water table
Wolfe Inlet	Wf	S				seasonal high water table
Wood Island	Wi	S				seasonal high water table
Land types, features		N.C.	— not classified			

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[1] Unlisted phases are included with the modal soil for this interpretation.

[2] Degree of limitation: Sl-slight; M-moderate; S-severe; U-unsuitable.

[3] Major soil property is from Table 29.

Table 31. Soil limitations for area-type sanitary landfill[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Depth to seasonal high true groundwater table[2](m) (soil drainage class)	greater than 1.5 m (rapidly drained)	1.5-1.0 m (well and moderately well drained)	less than 1.0 m (imperfect, poorly, and very poorly drained)
Flooding	none	less than once in 50 years	more than once in 50 years
Permeability[4] (subsoil) (cm/h)	less than 5	this rating not used	more than 5
Slope[3](%)	0-9	9-15	15-25
Subsoil texture[3,5]	sandy loam, loam, silt loam, sandy clay loam	silty clay loam, clay loam, sandy clay, loamy sand	silty clay, clay, gravel, sand, organic
Depth to bedrock[6](m)	greater than 2.0 m	2.0-1.0 m	less than 1.0 m
Surface stoniness	stoniness is not a factor on soils in the province		

A fourth degree of soil limitation is also defined for area type sanitary landfill:

Unsuitable:
- Depth to seasonal high water table less than 0.30 m with permeability greater than 1 cm/h
- Flood more than once in 10 years
- Permeability greater than 25 cm/h
- Slopes greater than 25%
- Depth to bedrock less than 0.5 m
- Organic soils

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[1] Limitation based on (1) Rose, R.D., et al. 1969. Use of Soils in the Fourteen-County Appalachia Region of New York State. Agronomy Mimeo 69-5, Department of Agronomy, Cornell University; (2) U.S. Dept. of Agric., Soil Conservation Service. 1971. Guide for Interpreting Engineering Uses of Soils. Soils Memorandum SCS-45 (Rev. 2).

[2] This refers to the true groundwater table and associated drainage classes are grouped accordingly. Soils that are poorly or imperfectly drained as a result of a perched water table (that is, extremely slow permeability, less than 0.1 cm/h) can be rated one class higher.

[3] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dep. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[4] This reflects the soil's ability to retard the movement of leachate from landfills. It is based on constant head hydraulic conductivity tests run on core samples.

[5] The subsoil texture reflects the ease of excavation and trafficability.

[6] Because the bedrock is a soft sandstone with numerous cracks its ability to act as a filtering agent is poor. This can result in contamination of the groundwater and wells using it.

Table 32. Soil limitations for area-type sanitary landfill

Map unit and soil phase[1]; numerator part of map symbol		Degree of limitation[2] with indicated slope classes				Major soil property[3] other than slope influencing limitations and use
		B, C, D 0-9%	E,I 9-15%	F,J 15-30%	G over 30%	
Abney Road	Ab	U				organic soil
Alberry	Al	M	M	S	U	shallow soil over
	Ald	S	S	S	U	bedrock materials
Arlington	Ar	U				organic soil
Baptist Point	Bp	S				high groundwater table
Brackley	Br	S				seasonal perched water table
Bunburry	Bu	M	M	S	U	depth to bedrock materials
Canavoy	Ca	U				organic soil
Carey Point	Cp	S				depth to water table
Charlottetown	Ch	M	M	S	U	depth of soil over
	Chd	S	S	S	U	bedrock materials
Crapaud	Cr	S				seasonal water table
Culloden	Cu	M	M	S	U	depth of soil
	Cud	S	S	S	U	material over bedrock materials
Dunblane	Db	M				seasonal water table
Dunstaffnage	Df	M	M	S	U	material over bedrock materials
Duvar	Du	S	S	S		seasonal water table
Egmont	Eg	S				seasonal water table
Emyvale	Em	U				depth to bedrock
Enmore	En	U				organic soil
Fifteen Point	Fp	M	M	S		depth over bedrock
Frenchfort	Fr	U				organic soil
Gowanbrae	Go	M	M	S		depth of soil over
Haliburton	Ha	M	M	S	U	bedrock materials
Haliburton Brook	Hab	M				seasonal high water table
Hazelbrook	Hz	U				organic soil
Hebron	He	S				seasonal water table
Kildare	Ki	M	M	S	U	depth and texture of soil material over bedrock
Lake Verde	Ve	U				organic soil
Locke Road	Lr	S				depth to water table
Malpeque	Ma	S	S			depth to water table
Margate	Mg	S	S			depth to water table
Mossy Point	Mp	S				high groundwater table
Munn Road	Mr	S				seasonal water table
Newton	Ne	M	M	S	U	depth over bedrock
O'Leary	Ol	M	M	S	U	seasonal water table
Orwell	Or	S	S			high water table
Pisquid	Pi	U				organic soil

Table 32. Soil limitations for area-type sanitary landfill (concluded)

Map unit and soil phase[1]; numerator part of map symbol		Degree of limitation[2] with indicated slope classes. B, C, D 0-9%	E,I 9-15%	F,J 15-30%	G over 30%	Major soil property[3] other than slope influencing limitations and use
Pownal	Po	U				organic soil
Rocky Point	Rp	S				high groundwater table
Salt Grass Point	Sp	S				high groundwater table
Tignish	Ti	M	M	S	U	depth to bedrock
Uigg	Ui	S	S			seasonal water table
West Point	Wp	S				seasonal high groundwater table
Winsloe	Wn	S				high water table
Wolfe Inlet	Wf	S				seasonal perched water table
Wood Island	Wi	S				seasonal groundwater table
Land types, features		N.C. — not classified				

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[1] Unlisted phases are included with the modal soil for this interpretation.

[2] Degree of limitation: Sl-slight; M-moderate; S-severe; U-unsuitable.

[3] Major soil property is from Table 29.

Table 33. Soil limitations for athletic fields[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Depth to water table (m) during period of use (soil drainage class)	greater than 0.75 m (rapidly,[2] well, and moderately well drained)	0.75-0.5 m (imperfectly drained)	less than 0.5 m (poorly drained)
Permeability[3] (surface 30 cm) (cm/h)	greater than 2.0	less than 2.0	this rating not used
Flooding	floods less than one in 5 years during heavy use period	this rating not used	floods more frequently than once in 5 years during heavy use period
Slope[2](%)	0-2	2-5	5-9
Available moisture[4] capacity (cm) (moisture deficiency)	greater than 9 (slight or no moisture deficiency	5-9; (moderate moisture deficiency)	less than 5; (severe moisture deficiency)
Surface texture[2,5]	sandy loam, loam, silt loam[6]	clay loam, sandy clay loam, silty clay loam, loamy sand[6]	sandy clay, silty clay, clay, sand, organic
Depth to bedrock[7](m)	greater than 1 m	1-0.5 m	less than 0.5 m
Coarse fragments on the surface[2] (%)			
(a) gravel and cobbles	less than 3	3-20	greater than 20
(b) stones	not a factor on soils in the province		

Table 33. Soil limitations for athletic fields[1] - guideline criteria (concluded)

Susceptibility to frost action[8]	Degree of limitation		
	Low	Moderate	High
Well and imperfectly drained	GW, GP, SW, SP	GM, GC, SM, SC, CL	ML, MH
Poorly drained	GW, GP	SW, SP, GC, CL	GM, SM, SC, ML, MH

A fourth degree of soil limitation is also defined for athletic fields:

Unsuitable: - Persistent wetness
- Slopes greater than 9%
- More than 50% gravel and cobbles
- Yearly flooding
- Organic soils

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[1] Limitation based on (1) Rose, R.D., et al. 1969. Use of Soils in the Fourteen-County Appalachia Region of New York State. Agronomy Mimeo 69-5, Dept. of Agronomy, Cornell University; and (2) Coen, G.M., and W.D. Holland. 1976. Soils of Waterton Lakes National Park, Alberta. Alberta Institute of Pedology, Information Report NOR-X-65.

[2] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dept. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp.

[3] This item reflects the soil's ability to dry out in the spring and also after rains. Based on constant head hydraulic conductivity tests run on core samples.

[4] This item attempts to show possible moisture deficiencies as related to moisture requirements for adequate vegetative growth. Class limits are based on the available moisture in the top 50 cm of soil.

[5] Surface texture is related to maintenance as it affects trafficability, wetness conditions after rainfalls, wind erosion, and so forth.

[6] Surface soils of this texture may be subject to wind erosion and, if so, should be downgraded one class.

[7] The bedrock is rippable Permocarboniferous sandstone.

[8] Susceptibility to frost action based on the Guide for Interpretating Engineering Uses of Soils. U.S. Dept. of Agric., Soil Conservation Service. 1976. Soils Memorandum SCS-45 (rev. ed.). Some modifications were made. Frost heaving of a soil can have disastrous effects on athletic field conditions.

Table 34. Soil limitations for outdoor living[1] - guideline criteria

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Depth to water table during period of use			
(a) tent and trailer	greater than 0.75 m rapidly,[2] well, and moderately well drained	0.75-0.5 m (imperfectly drained)	less than 0.5 m (poorly drained)
(b) picnic areas	greater than 0.4 m (rapidly, well, and moderately well drained)	greater than 0.4 m (imperfectly drained)	less than 0.4 m (poorly drained)
Flooding			
(a) tent and trailer parks	floods less than once in 10 years during season of use	floods less than once in 5 years during season of use	floods more than once in 5 years during season of use
(b) picnic areas	floods less than once in 5 years during season of use	floods less than once in 3 to 5 years during season of use	floods more than once in 3 years during season of use
Permeability[3] (surface 30 cm)	greater than 1.0 cm/h	less than 1.0 cm/h	this rating not used
Slope[2]			
(a) tent and trailer parks	0-5%	5-9%	9-15%
(b) picnic areas	0-9%	9-15%	15-30%
(c) paths and trails	0-15%	15-30%	over 30%
Depth to bedrock	greater than 0.5 m	less than 0.5 m	this rating not used
Available moisture[4]	slightly or no moisture deficiency; greater than 9 cm of available moisture	moderate moisture deficiency; 5-9 cm of available moisture	severe moisture deficiency; less than 5 cm of available moisture
Surface texture[2],[5]	sandy loam, loam, silt loam	clay loam, sandy clay loam, silt clay loam, loamy sand, stable sand	sandy clay, silty clay, clay, loose sand

Table 34. Soil limitations for outdoor living[1] - guideline criteria (concluded)

Major soil properties influencing uses	Degree of limitation		
	Slight to none	Moderate	Severe
Surface coarse fragments[2]			
(a) gravel and cobbles	less than 20%	20-50%	greater than 50%
(b) stones	not a factor on soils in the province		

A fourth degree of soil limitation is also defined for outdoor living:

Unsuitable:
- Permanently wet soils
- Slopes greater than 30% for picnic areas, paths, and trails
- Slopes greater than 15% for trailer parks and tenting areas
- Yearly flooding
- Organic soils

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[1] Region of New York State. Agronomy Mimeo 69-5, Dept. of Agronomy, Cornell University; and (2) Coen, G.M., and W.D. Holland. 1976. Soils of Waterton Lakes National Park, Alberta. Alberta Institute of Pedology, Information Report NOR-X-65.

[2] Class definitions from Canada Soil Survey Committee, Subcommittee on Soil Classification. 1978. The Canadian system of soil classification. Can. Dept. Agric. Publ. 1646. Supply and Services Canada, Ottawa, Ont. 164 pp. Stoniness is not a factor on soils in the province.

[3] This reflects the soil's ability to dry out in the spring and after rainstorms. It is based on constant head hydraulic conductivity tests run on core samples.

[4] This item attempts to evaluate the adequacy of moisture for vegetative growth. Class limits are based on the available moisture in the top 50 cm of soil.

[5] Surface texture is related to surface wetness after rainfalls, dustiness, trafficability, and so forth.

Table 35. Soil limitations for recreational purposes

		Degree/nature of limitation[3]				
Map unit name and symbol[1]		Slope[2] phase	Athletic fields	Camp areas	Picnic areas	Paths and trails
Abney Road	Ab	-	U(5)	U(5)	U(5)	U(5)
Alberry	Al	B,C	Sl-M(8)	Sl	Sl	Sl
		D	S(4)	M(4)	Sl	Sl
		E,I	U(2)	S(4)	M(4)	Sl
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Arlington	Ar	-	U(5)	U(5)	U(5)	U(5)
Baptist Point	Bp	-	U(1)	U(1)	U(1)	U(1)
Brackley	Br	B,C,D	S(1)	M(1)	M(1)	M(1)
Bunbury	Bu	B,C	M(5,6)	Sl	Sl	Sl
		D	S(4)	M(4)	M(4)	Sl
		E,I	U(2)	S(4)	M(4)	Sl
Canavoy	Ca	-	U(5)	U(5)	U(5)	U(5)
Carey Point	Cp	B,C	S(1)	S(1)	M(1)	M(1)
Charlottetown	Ch	B,C	Sl-M(8)	Sl	Sl	Sl
		D	S(4)	M(4)	Sl	Sl
		E,I	U(2)	S(4)	M(4)	Sl
		F,J	U(2)	U(3)	S(4)	M(4)
		F	U(2)	U(3)	U(2)	U(2)
Crapaud	Cr	B,C,D	S(1)	S(1)	M(1)	M(1)
Culloden	Cu	B,C	Sl-M(6)	Sl	Sl	Sl
		D	S(4)	M(4)	Sl	Sl
		E,I	U(2)	S(4)	M(4)	Sl
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Dunblane	Db	B,C	M(8)	Sl	Sl	Sl
		D	S(4)	M(4)	Sl	Sl
Dunstaffnage	Df	B,C	M(6)	Sl-M(5)	Sl-M(5)	Sl
		D	S(4)	M(4)	Sl-M(5)	Sl
		E,I	U(2)	S(4)	M(4)	Sl
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Duvar	Du	B,C,D	S-U(1,2)	S(1)	M(1)	M(1)
Egmont	Eg	-	U(1)	U(1)	U(1)	U(1)
Emyvale	Em	B,C,D	S(5,7)	M(5,6)	M(5,6)	Sl
		E,F	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Enmore	En	-	U(5)	U(5)	U(5)	U(5)

Table 35. Soil limitations for recreational purposes (continued)

Map unit name and symbol[1]		Degree/nature of limitation[3]				
		Slope[2] phase	Athletic fields	Camp areas	Picnic areas	Paths and trails
Fifteen Point	Fp	B,C	M(8)	M(3)	M(3)	S1
		D	S(4)	M(3)	M(3)	S1
		E,I	U(2)	M(4)	M(4)	S1
Frenchfort	Fr	-	U(5)	U(5)	U(5)	U(5)
Gowanbrae	Go	B,C	S1-M(6)	S1	S1	S1
		D	S(4)	M(4)	S1	S1
		E,I	U(2)	S(4)	M(4)	S1
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Haliburton	Ha	B,C	S1	S1	S1	S1
		D	S(4)	M(4)	S1	S1
		E,I	U(2)	S(4)	M(4)	S1
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Haliburton Brook	HaB	B,C	M(1)	S1	S1	S1
		D	S(4)	M(4)	S1	S1
Hazelbrook	Hz	-	U(5)	U(5)	U(5)	U(5)
Hebron	He	B,C	M(1)	M(1)	M(1)	S1
		D	S(4)	M(1)	M(1,4)	S1
Kildare	Ki	B,C	S1-M(6)	S1	S1	S1
		D	S(4)	M(4)	S1	S1
		E,I	U(2)	S(4)	M(4)	S1
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Lake Verde	Ve	-	U(5)	U(5)	U(5)	U(5)
Locke Road	Lr	-	U(1)	U(1)	U(1)	S-U(1)
Malpeque	Ma	B,C	S(1)	M(1)	M(1)	M(1)
		D	S(1,4)	M(1)	M(1)	M(1)
Margate	Mg	-	U(1)	U(1)	U(1)	U(1)
Mossy Point	Mp	-	U(1)	U(1)	U(1)	U(1)
Munn Road	Mr	B,C,D	S(1)	M(1)	M(1)	M(1)
Newton	Ne	B,C	S1-M(8)	S1	S1	S1
		D	S(4)	M(4)	S1	S1
		E,I	U(2)	S(4)	M(4)	S1
O'Leary	Ol	B,C,D	M-S(2,8)	M(3)	M(3)	S1
		E,I	U(2)	S(4)	M(3)	S1
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)

Table 35. Soil limitations for recreational purposes (concluded)

			Degree/nature of limitation[3]			
Map unit name and symbol[1]		Slope[2] phase	Athletic fields	Camp areas	Picnic areas	Paths and trails
Orwell	Or	-	U(1)	U(1)	U(1)	S-U(1)
Pisquid	Pi	-	U(5)	U(5)	U(5)	U(5)
Pownal	Po	-	U(5)	U(5)	U(5)	U(5)
Rocky Point	Rp	-	U(1)	U(1)	U(1)	S-U(1)
Salt-Grass Point	Sp	-	U(1)	S(1)	S(1)	M(1)
Tignish	Ti	B,C	M(8)	Sl	Sl	Sl
		D	S(4)	M(4)	Sl	Sl
		E,I	U(2)	S(4)	M(4)	Sl
		F,J	U(2)	U(3)	S(4)	M(4)
		G	U(2)	U(3)	U(2)	U(2)
Uigg	Ui	B,C,D	S(1)	M(1)	M(1)	M(1)
		E,I	U(2)	S(4)	M(1)	M(1)
West Point	Wp	-	S(1)	S(1)	M(1)	M(1)
Winsloe	Wn	-	U(1)	U(1)	U(1)	S-U(1)
Wolfe Inlet	Wf	B,C,D	S(1)	S(1)	M(1)	M(1)
Wood Island	Wi	-	U(1)	U(1)	U(1)	S-U(1)
Land types, features			N.C. -- not classified			

[1] Soil phases (except slope) are included in each map unit; they do not affect interpretations.

[2] Where slope phase is not shown, all slope phases mapped are included in interpretations.

[3] Nature of limitations (number in parentheses) is found under major soil property influencing use in Table 33 for athletic fields, Table 34 for outdoor living. Degree of limitation: Sl-slight; M-moderate; S-severe; U-unsuitable.

sewage disposal and water supply are not considered in determining the soils rating. The ratings are based on characteristics examined in the pedological classification of soils and do not include the many other economic, aesthetic, and physical conditions that determine the potential of an area for recreation. Vehicular traffic is assumed to be confined to access roads but the sites are subject to heavy foot traffic. Except as influenced by moisture, the soil's ability to maintain adequate vegetation is not a factor.

As construction is minimal, the soil properties of greatest concern are those that (1) interfere directly with the intended use -- wetness, flooding, permeability, slope, surface coarse fragments, and depth to bedrock, and (2) affect maintenance -- flooding, permeability, available moisture, surface texture, and slope.

Table 34 shows criteria used in rating soils for outdoor living and Table 35 shows the rating of each unit as slight, moderate, severe, or unsuitable followed by a number indicating the major soil property in the guide that most influenced each particular rating.

ORGANIC SOILS OF PRINCE EDWARD ISLAND

Definition and peatland formation

Organic soils contain 17% or more organic carbon or 30% or more organic matter by weight and meet the following specifications:

For organic materials that are commonly saturated with water and consist mainly of mosses, sedges, and other hydrophytic vegetation the requirements to be classed as organic soils are as follows:

1. If the surface layer consists of fibric organic material with or without mesic or humic Oh horizons thinner than 15 cm, the organic material must extend to a depth of at least 60 cm.
2. If the surface layer is mesic or humic the organic material must extend to a depth of at least 40 cm.
3. If a lithic contact occurs at a depth shallower than 40 cm, the organic material must extend to a depth of at least 10 cm. Mineral material less than 10 cm thick may overlie the lithic contact, but the organic material must be more than twice the thickness of the mineral layer.
4. The organic soil may have a mineral layer thinner than 40 cm on the surface provided that the underlying organic material is at least 40 cm thick.
5. Mineral layers thinner than 40 cm that begin within a depth of 40 cm from the surface may occur within an organic soil. A mineral layer or layers with a combined thickness of less than 40 cm may occur with the upper 80 cm (7). (Fig. 15).

Peatlands are dynamic systems formed by the interaction of biological and physical environmental factors. The stratigraphy of peat materials deposited through long periods of time is evidence of the environmental conditions operating throughout the period (22). The organic material is accumulated and preserved in these dynamic systems because they are saturated either continuously or for long periods under anaerobic conditions (deprived of oxygen).

The water that sustains these organic terrains or peatlands may vary greatly in the concentration of ions. The pH values presented in Table 37 support this observation. The degree of ion concentration in the water depends on the length of time that the water resided in the contributing mineral landscape and on the solubility of the elements. Thus, peatland receiving water from precipitation only receives low amounts of plant nutrients, whereas peatlands receiving water from surrounding mineral terrain or water originating from subterranean sources might be very high in certain elements. These different nutrient concentrations, combined with water table heights, volume of water flowing through the organic deposits, and climate, give rise to different plant communities as well as different peat landforms.

Peatlands are formed by the infilling of shallow water bodies or by the gradual buildup of plant material on wet mineral soil. Wet mineral soil might be the result of a topographical depression or the influence of water seeping down a slope.

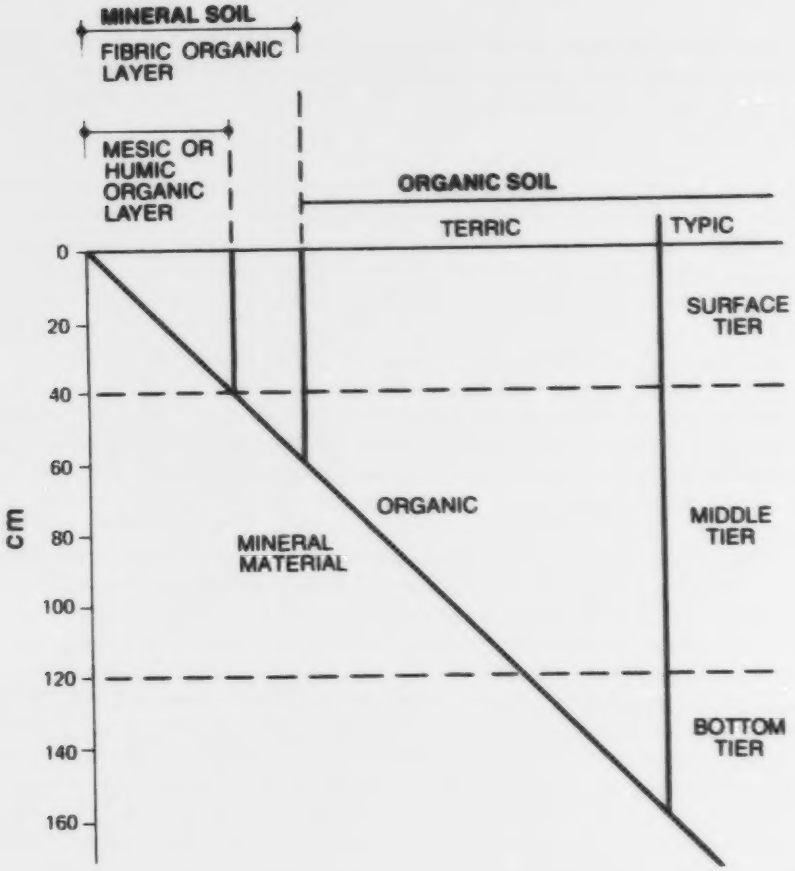
MINERAL SOIL
FIBRIC ORGANIC LAYER
MESIC OR HUMIC ORGANIC LAYER
ORGANIC SOIL
TERRIC
TYPIC
0
20
40
60
80
100
120
140
160
cm
SURFACE TIER
MIDDLE TIER
BOTTOM TIER
ORGANIC
MINERAL MATERIAL

Figure 15. Diagrammatic representation of depth relationships involved in organic soil classification.

All peatlands are observed in their present stage of development. Some might be in a juvenile stage due to, for example, recent groundwater changes, whereas other peatlands have apparently more or less stabilized under present environmental conditions.

The Geological Survey of Canada has dated the basal layers of four peat bogs. The oldest material encountered in Prince Edward Island was that from the base of Portage Bog, Prince County. This was dated 9880 years before the present, plus or minus 150 years.

Some characteristics and kinds of peat material

The degree of decomposition of peat material is the main characteristic used to establish the great group of the Organic order of the Canadian soil classification system and it is also the main characteristic that determines the suitability for various uses.

The degree of decomposition was determined either in the laboratory or in the field. In the laboratory the fiber content was determined by the amount of fiber that was retained on a 100-mesh sieve (0.015 mm). In the field the degree of decomposition was assessed by using the humification or decomposition scale developed by the Swedish geologist, von Post. This scale assesses the least decomposed material as H.1 and the most decomposed material as H.10. The nearly undecomposed material is called fibric, the well-decomposed material is called humic, and the intermediate material is called mesic. The following is a list of typical properties of fibric, mesic, and humic materials.

Property	Fibric	Mesic	Humic
Rubber fiber content (%)	>40	10-40	<10
Von Post scale	1 to 4	4 to 7	7 to 10
Bulk density g/cm^3	<0.075	0.075 to 0.195	0.195
Total porosity (%)	>90	90 to 85	<85
Fibers recognizable as to botanical origin	all	most	few
Pyrophosphate index	>5	3 to 5	<5
0.1 bar water (volume %)	<48	48 to 70	>70
C/N ratio	±80	25-30	15-20

Although many different kinds of peat material exist, only four types were recognized for the purpose of this report.

Sphagnum peat

This may be found abundantly on ombrotropic bogs such as the Domed and Flat Bog landforms. As the name implies, the botanical origin is dominantly Sphagnum\species, although it frequently contains woody roots and stems of a number of bog shrubs as well. The color of sphagnum peat varies in shades of yellowish brown for the least decomposed to brownish black for the most decomposed. The structure varies from loose fibrous in fibric material to amorphous in certain humic materials. Firbic sphagnum peat has a very high absorptive capacity, a low ash content, and is very acidic.

Sedge peat

This peat material may be found on the Fen as well as on the Estuarine Marsh landforms or in the lower strata of the Bog landforms. In certain locations sedge peat may have varying amounts of mineral sediments mixed in. The botanical origin varies and depends on the water quality of the site. The color of sedge peat often is light brown. The structure is nearly always felted or matted. The pH and other chemical characteristics vary widely.

Forest peat

This material is found on the Swamp landforms. The color of forest peat varies from reddish brown to dark brown or black. The peat material is usually moderately well decomposed and consists of weak short wood fibers that frequently rub down to an amorphous texture. The pH and other chemical characteristics vary widely and reflect the water quality that sustains the site.

Aquatic peat

This peat is found in topographical positions that are or once were shallow bodies of water. In Prince Edward Island, aquatic peat most generally occurs in the lower strata of the Stream Swamp landform. The botanical origin of much of the material is often not identifiable because of the high degree of humification or its colloidal nature. Compared with slightly decomposed moss peat, it has a high ash content and consequently, a relatively high bulk density. Frequently, siliceous skeletons may be found in this material. It also exhibits a very high shrinkage.

Peat landform classification

By stereoscopically viewing aerial photographs most organic landforms are readily identified. The peat landform, as expressed by vegetation, shape, and position in the landscape, has important diagnostic value in the prediction of a range of characteristics that may occur within the landform.

The various kinds of peat landforms evolved because of differences in the kind and duration of climatic, geomorphologic, and hydrologic conditions.

Heinselman (23) summarized the following most important factors that give rise to and effect the distribution and kind of peat landform.

1. Location in the peatland with respect to mineral soil margins, substratum relief, and water sources.
2. Topography of the peat surface.
3. Water levels and water movements.
4. Chemical properties of water flowing into and out of the peatland.
5. Botanical origin, decomposition, and thickness of peats.
6. Natural vegetation.

The peatland classification presented in this report follows the hierarchal structure as used in some Canadian soil surveys. Each level stresses a different aspect of the peatland. The broadest subdivision or class is based on the features that either make or contribute to the character of the peatland. The class also differentiates between the basic peatland environments, depending on the plant nutrient level found in them. They are the ombrotrophic peatlands (bogs) or eutrophic peatlands (fens and swamps). The remaining levels in the classification differentiate the peatland forms mainly on the basis of surface and subsurface morphology or, in the case of swamps, on their proximity to permanent water bodies.

The Bog, Fen, Swamp, and Marsh peatland classes and the associated peatland forms that occur in Prince Edward Island are as follows:

Bog

A bog is a peat-covered or peat-filled wetland. The water table is at or near the surface. The bog surface is often raised or level with the surrounding wetlands and is virtually unaffected by the nutrient-rich groundwaters contributed from the nearly mineral soils. Hence, the groundwater of the bog is generally acidic and low in nutrients.

The dominant peat materials are sphagnum and forest peat, underlain at times by sedge peat. The soils are Fibrisols and Mesisols. The bogs may be treed or treeless but are usually covered with Sphagnum species and ericaceous shrubs.

The classification key to Bog landforms in Prince Edward Island is as follows:

1. Surface raised above surrounding wetlands.
    2. Surface convex
        3. Core not frozen
            5. Convex surface often extensive; not occurring in fens Domed Bog.

1. Surface not raised above surrounding wetlands.
    11. Surface relatively level
        13. Not adjacent to water bodies
            16. Flat deposit; depth generally uniform .... Flat Bog
                11. Surface not level
                    18. Core not frozen
                        19. Surface concave .... Bowl Bog.

Fen

A fen is a peat-covered or peat-filled wetland with a high water table usually at or above the surface. The sustaining waters are mainly nutrient-rich or minerotrophic and originate as runoff from mineral soils in the watershed. The dominant peat materials are shallow to deep, well to moderately decomposed sedge peats. The soils are Mesisols and Humisols. The vegetation consists dominantly of sedges, grasses, and reeds, and at times with shrubs and a few trees.

The classification key to fen landforms in Prince Edward Island is as follows:

1. Surface not raised above surrounding terrain except in low hummocks and ridges.
    2. Without pronounced surface pattern
        5. Featureless, adjacent to water bodies
            6. Not floating; located in main channel or along banks of continuously flowing or permanent streams .... Stream Fen.
1. Surface flat or depressional.
    10. Core not frozen
        12. Surface level without pronounced surface pattern .... Horizontal Fen.

Swamp

A swamp is a peat-filled area or mineral wetland with standing or gently flowing waters occurring in pools and channels. The water table is usually at or near the surface. There is a strong water movement from the margin or other mineral sources; hence, the waters are nutrient rich. If peat is present it is mainly well-decomposed forest peat underlain at times by fen peat. The soils are Mesisols and Humisols. The vegetation is covered by a dense tree cover of coniferous or deciduous species, tall shrubs, herbs, and mosses.

The classification key to Swamp landforms in Prince Edward Island is as follows:

1. Adjacent to permanent waterbody.
    2. Located along banks of continously flowing or semipermanent streams (includes shore swamps) .... Stream Swamp.
1. Not adjacent to permanent water body.
    3. In topographically defined basins.
        4. Basin deposit; depth greatest in center .... Basin Swamp.
    3. Not in topographically defined basins.
        5. Discharge area; surface irregular .... Spring Swamp.

Marsh

The Estuarine High Marsh and Estuarine Low Marsh are not differentiated in this report. The Salt Marsh map unit in the mineral section of this soil survey report is an undifferentiated miscellaneous land type and might contain organic soils, whereas the Estuarine Marsh Swamp is an undifferentiated peatland landform.

Classification and organic soil associations

Organic soils may be classified into great groups, subgroups, families, and series according to guidelines given in The Canadian System of Soil Classification (7). The classification is based chiefly on the interrelationships of the main organic peat materials within an arbitrarily selected control section, their depth, degree of decomposition, and the texture of underlying mineral materials. The control section extends from the surface to depths of 130 to 160 cm and is divided into surface, middle, and bottom tiers (Fig. 15). If the underlying mineral materials occur below the middle tier, the subgroup classification is based on the dominant kind of material found in the middle tier; if mineral contact occurs in the middle tier, the classification is based on the dominant peat material in the middle and surface tiers.

In Prince Edward Island only the dominant subgroup of each association is described. Mapping at the series level was not attempted and is not warranted at present by demand for use interpretations. However, the framework for such mapping is available and can best be applied to selected areas if and when required in the future.

The organic soil association, as used in this report, is a group of differing classification criteria each with their own attributes and interpretive values. The association therefore provides information on the following:

1. The dominant type of peat material.
2. The peat landform.
3. The organic soil classification.
4. The vegetation.
5. The topography and general hydrology.

The concept of organic soil association as a mapping aid facilitates the symbolization of a complex natural system. The organic soil map unit in this report has the same name as the organic soil association.

Table 36. Classification and area of organic soils in Prince Edward Island

Association	Landform	Dominant subgroup	Area (ha)
Abney Road	Stream Swamp	Terric Humic Mesisol	576
Arlington	Domed Bog	Typic Fibrisol	972
Canavoy	Spring Swamp	Terric Mesisol	117
Enmore	Basin Swamp	Terric Mesisol	96
Frenchfort	Estuarine Marsh	Terric Fibrisol	378
Hazelbrook	Stream Fen	Terric Mesisol	150
Lake Verde	Horizontal Fen	Terric Mesisol	669
Pisquid	Bowl Bog	Terric Humic Mesisol	420
Pownal	Flat Bog	Typic Mesisol	2959

The description of these associations may be found in alphabetical order in the Description of the soils section in this report.

Use of organic soils

Organic soils sustain themselves when used for wildlife or for recreation, but they are a nonrenewable resource when used for mining of peat material, for agricultural crops, or for forestry.

Organic soils occur on only 1.1% (6337 ha) of the land area of Prince Edward Island. Relative to the total land area suitable for crop production, it is easy to see why these soils have not been of great concern to people interested in crop production. In the past few years, however, the number of questions being asked about land use potential of these soils has increased. What follows is an attempt to present some of the ways in which organic soils can be utilized as well as some of the problems encountered in their use.

The agricultural and horticultural potential of organic soils

No agricultural or horticultural use is made of the organic soils for crop production in Prince Edward Island. There are several possible reasons for this: (a) a high investment is required to make organic terrain productive, (b) local experience in the use of organic soils is limited, (c) information is lacking regarding microclimate and hydrology on various peat landforms, making all recommendations for agricultural use suspect until more pertinent data are available, and (d) there is no incentive to use organic soil for growing crops because existing crops produce well on relatively abundant and available mineral soil.

In Ontario and Quebec treeless Typic Mesisol soils, which are slightly acidic to neutral in soil reaction, are best suited for crop production. In Prince Edward Island the areas that have these qualities are rare. Under the island's climatic conditions those soils that have acceptable hydraulic conductivity values and sufficient depth are most suitable for crop production. Those conditions are most frequent in the Typic Fibrisol subgroup, a common subgroup in the Arlington association and to a lesser extent in the Pownal association.

Arlington and Pownal associations are extremely acidic and very low in plant nutrients. The Pownal association is particularly unpredictable in the degree of decomposition and depth to mineral soils. The low degree of plant nutrients and the extreme acidity mean that very high inputs of capital, labor, and skill are required to utilize these organic soils. Such utilization would require careful planning and detailed field surveys, not only to determine the suitability and depth of peat material, but also to obtain information on underlying mineral material and its topography so that drainage plans could be designed. The characteristics of the underlying mineral material are of great importance because they are used to determine the coninuing suitability of the area as cropland when the peat becomes too thin to perform as a peat soil, and in designing drains.

The feasibility of growing wild rice on some Fen and Swamp landforms is unproven in Prince Edward Island, although rice grain is harvested annually in the province (for example, at Pisquid Pond). Although several river valleys contain organic landforms that are possibly suitable for growing wild rice, it is not known what difficulties might be encountered. Studies that should be done before developing these landforms include the ecological implications of development as well as the feasibility of the hydrologic, engineering, and economic requirements.

Drainage of organic terrain

Distinction has to be made between drainage for peat products extraction, such as horticultural peat moss mining, for fuel peat mining, and drainage for crop production. The purpose of drainage for peat products extraction is to achieve consolidation of the peat by lowering the water table as far down as is practical, depending on the amount of peat to be removed. For horticultural peat moss mining, which might take many years to harvest, it is advisable not to drain excessively deep because accelerated decomposition might result in a less desirable product.

The purpose of drainage for crop production is to lower the water table to the optimum moisture content in the rooting zone. This ideal condition exists when capillary water is able to rise into the rooting zone and sufficient air volume is created below the rooting zone to prevent precipitation from saturating it.

The hydraulic conductivity of peat material is generally low and mainly dependent on the degree of humification and compaction. Well-humified peat, for example, may have water transmissibility as low as amorphous clay. Undecomposed sphagnum peat has the highest hydraulic conductivity of Prince Edward Island peat soils as well as the highest water-holding capacity.

Due to this low water transmissibility, as well as the high water-holding capacity of sphagnum peat, ditches have a relatively small impact after the initial lowering of the water table. It is emphasized that drainage normally deteriorates over time due to compaction and accelerated decomposition. When this occurs the excess water is removed not only by gravitation but also by evaporation. The latter would probably be slow under prevailing climatic conditions during the growing season but no local experience is available in regard to drainage of peatlands for growing crops. On the Avalon Peninsula in Newfoundland, "a drainspace of 15 m and 1.2 m deep is needed to maintain a water table between 30 and 60 cm below the surface in July, the dryest month. The distance between ditches appears to be more important than the depth in lowering the water table. A ditch spacing no greater than 25 m is recommended for forage production and mole drains placed diagonally to open ditches provide an inexpensive form of supplementary drainage. Vegetable crops are much more sensitive to high water tables than forage mixtures. Even when covered ditches are spaced as close together as 7 m vegetable crops can still benefit from supplementary drainage such as can be obtained from growing crops on ridges" (4).

Considering climatic parameters such as average mean rainfall, average monthly temperature, and average hours of bright sunshine during July, it appears that the above spacings could safely be applied to similar organic soils in Prince Edward Island.

The close spacing of ditches is necessary due to the very strongly developed elliptic shape of the water table between the ditches in peat materials. In designing ditch spacings the decision has to be made on how much drawdown is required halfway between the drains to create optimum soil-water-plant relations. This drawdown should not be based on the initial hydraulic conductivity but on the hydraulic conductivity that is to be expected a number of years after the initial drainage. Ideally, the surface of the field should reflect the predicted elliptic shape of the water table. This is brought about before liming and fertilizing. It is also important that subsidence is taken into account when designing drainage plans for bogs. The degree of subsidence depends on different factors, the most important of which are as follows (25):

1. The depth of peat.
2. Water content.
3. Degree of humification. Physical, chemical, and botanical
4. characteristics of the peat.
5. Possible breakdown of the peat after drainage and the resulting aeration.
6. The depth of the ditches or tiles.
7. The gradient in the peat surface and the mineral subsoil in relation to the surroundings (artesian water).

Open steep-sided ditches are usually used for initial disposal of excess water. Very wet terrain is drained in stages and deepened to the required depth after excess water has been disposed of. The location of the main ditches must be well chosen so that engineering works do not become obsolete. This requires a topographical survey to determine surface elevations, depth and type of peat material, and topographical elevations of the mineral soil. It is best not to install tile lines intended for soil drainage until most of the initial subsidence has taken place.

Each terrain must be judged separately for its intended use.

Fertilizer needs of organic soils

Ombrotrophic peatland requires significant amounts of major and minor plant nutrients to make production of crops successful, but success should not be expected too quickly. It takes several years for the plow layer to acquire the biological-physical-chemical balance needed to grow some crops. Plant roots of normal agricultural crops do not penetrate the acidic peat. It is best to contact the regional research station that does research in peatland fertilizer requirements for guidance.

Modification of growing conditions on organic soils

The organic soil classification system does not take into account the microclimate, and when there are clear calm nights with low air humidity during the growing season air temperatures on organic soils fluctuate sharply between day and night. This is due not only to cold air flowing into a lower topographic position but also to the efficient insulating properties of the uppermost dry and very loose organic layer. This causes a greater heat gradient of the organic surface than occurs on mineral soil surfaces. The probability of night frost is greater on organic soils than on the surrounding mineral soils unless special measures are taken such as maintaining a firm compacted surface soil to ensure that stored heat can escape and warm the air. Frost damage may also be lessened or prevented by overhead irrigation, or by the addition to the surface of sand at rates of 500-1000 m^3 ha. Sand has several beneficial advantages; it increases the heat capacity and heat transfer in the soil, and it also greatly improves the trafficability. According to several European researchers the average temperature during the growing season is several degrees higher on sanded peat than on non-sanded peat and increases with the amount of sand used. Sanding also has a beneficial influence upon the structure of the plow layer. It should not be added until the humification of the plow layer is well advanced and field levels stable. Sanding is also effective in reducing wind erosion, in conserving the valuable plow layer, in extending the productive period, and in reducing ditch maintenance.

The forestry potential of organic soil

The Horizontal Fen, Stream Swamp, Basin Swamp, and Spring Swamp landforms are capable of producing merchantable stands of trees, but yields and kinds of trees vary greatly on these natural sites. The Horizontal Fen landform produces pulp wood and sawlogs, the Stream Swamp and Spring Swamp landforms produce mainly fuel-wood, and the Basin Swamp landform produces fence posts and shingles.

Proper drainage would increase yields and reduce windthrow on the above-mentioned landforms. Ditches for forestry use are generally wider and shallower than those for agricultural use because excavation and ditch maintenance are very expensive.

The Domed Bog, Flat Bog, Bowl Bog, Stream Fen, and Eastuarine High Marsh landforms are treeless or support only stunted trees or shrubs. Their low natural fertility and/or topographic position makes these landforms unsuitable for forestry under present conditions.

Peat products

To increase their supply of bedding material and organic matter, farmers formerly used the peat resource on a limited scale.

The deep sphagnum deposits normally found on the Domed Bog landforms, and to a lesser extent on the Flat Bog landform, are used for the production of horticultural peat moss. Since 1973, commercial horticultural peat moss has been mined on Black Point Bog, a Domed Bog landform near Foxley River. The soils on the Domed landform are Typic fibrisols-sphagnic surface of the Arlington association. When milled, these Typic Fibrisols produce a nearly undecomposed absorbent and sterile horticultural peat moss, which is in high demand in the horticultural industry. The Arlington association covers about 972 ha, of which about 132 ha have been identified as nature reserves. Nearly 3400 ha occupied by the Pownal and Pisquid associations have good potential to satisfy local horticultural needs, but these soils are scattered in many small deposits and the depth of horticultural peat moss varies on them. The black or well-humified peat also has good potential as a soil amendment. It should be excavated in the fall and spread out to allow freezing before being used. The woody peats found on various Swamp landforms are also suitable for soil amendment. They too, should be excavated in the fall and spread out to allow freezing before being used.

The use of slightly humified peat in the control of oil spillage has shown interesting results in recent years. It is dried to a somewhat irreversible stage and impregnated with a light fuel oil. When ignited the oil provides sufficient heat to ignite the underlying crude oil layer. Smoke pollution near habitation centers might make this method objectionable.

Mining for fuel peat does not take place in Prince Edward Island. The most desirable soils for the production of fuel peat are compacted, low ash, moderately and well-decomposed sphagnum peats. Soils suitable for fuel peat production are in the Typic Mesisol and Humic Mesisol subgroups and are potentially found in the Arlington, Pownal, and Pisquid associations.

Some interest has been shown in the feasibility of using fuel peat as an alternate source of energy. It seems that fuel peat mining for home and other small-scale consumption is possible. Whether it is desirable depends on the evaluation of the hidden costs of peat mining, such as scarring of the landscape and the fact that it is a nonrenewable resource.

Engineering interpretation of organic soils

Foundation limitations: All organic soils in Prince Edward Island are unsuitable for road fill material and road foundation because of continuing compressibility.

Where the location of a proposed road cannot be changed and a stable roadbed is required, removal of peat material prior to backfill with mineral soil is necessary. Enclosure of the central part of the peat under the road has had a reasonable degree of success. When deep peat is encountered and slight settling is permissible, a brushed mat or bales of peat moss, washed in with sand, may be used as a foundation for the mineral soil backfill.

Organic soils are unsuitable for building foundation construction and either the peat material should be removed or durable piling should be driven into mineral material having a sufficiently high bearing strength.

Trafficability of organic soil

In their natural state the Domed Bog and Flat Bog landforms provide the best-tracked vehicular support because of their fibrous matted surface structure and low brush vegetation. Areas with low bearing strength frequently are on or near the relatively steep margin of Domed Bog landforms. It is stressed here that on peat land developed for agriculture, access roads should be constructed to avoid damage to the physical condition of the fields. These access roads should be built on mineral soil wherever possible. A narrow-gage railway could also be used.

Recreation potential of organic soil

The organic landforms are suitable for very low density recreation only. Their fragile surface requires that nature trails be frequently relocated or, if foot traffic is heavy, that boardwalks be installed.

Wildlife capability on organic terrain

The variety of plants and animals on organic terrain is reflected in the quality of the water that various peat landforms receive. The Swamp and Fen landforms have the most diversity and the Bog landforms have the least. The Stream Swamp landforms have the highest capability for producing several kinds of furbearing animals and waterfowl. Bog landforms that have little open water cannot support much wildlife.

Table 37. Chemistry of organic soil water[1] collected between a depth of 20 and 50 cm

Association	Location	pH	Ca ppm	Mg ppm	Conductivity mmhos/cm
Abney Road	Howland Ridge	6.8	38.0	12.0	323
Abney Road	Pisquid Pond	6.1	6.0	3.0	116
Arlington	Portage	3.8	2.0	1.4	91
Arlington	Portage	4.2	12.0	0.8	77
Canavoy	Riverton	5.7	10.0	2.4	100
Canavoy	Dalvay Beach	5.3	30.0	13.8	952
Emmore	Milo	6.6	38.0	1.8	200
Frenchfort	St. Andrews	5.9	10.0	9.8	200
Frenchfort	Brackley	6.4	49.0	14.0	9523
Hazelbrook	Cherry Hill	6.6	30.0	5.8	1587
Hazelbrook	Lake Verde	6.8	20.0	8.2	286
Lake Verde	Peakes	5.8	12.0	3.8	125
Lake Verde	Lake Verde	7.2	14.0	5.0	156
Pisquid[2]	Mount Stewart	4.1	6.0	1.2	69
Pisquid[3]	Mount Stewart	4.1	4.0	1.2	83
Pisquid[2]	Morell Rear	4.1	20.0	1.1	71
Pisquid[3]	Morell Rear	4.6	20.0	1.1	69
Pownal	Cherry Hill	4.1	6.0	1.6	91
Pownal	Tenmile House	4.1	4.0	0.6	63
Pownal	Foxley River	4.0	8.0	1.3	80

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[1] Analysis by Provincial Soil and Feed Test Laboratory.

[2] Sample taken from centre of bog.

[3] Sample taken from rim, or edge, of bog.

Table 38. Analysis of organic soils in Prince Edward Island[1]

Horizon	Depth cm	Fiber content Unrubbed %	Fiber content Rubbed %	Ash %	Total C %	Total N %	C/N ratio	Pyro-phosphate index	pH 0.01M CaCl^2	Bulk density g/cc	C.E.C.[2] meq/100 g	Elemental analyses[3] meq/100 g Ca	Mg	K	Na	ppm P
Abney Road (Terric Mesisol) - Location: Murray Harbour N 45°59'47" W 62°30'28"																
Om1	0-10	68	36					1.0	5.3	0.09	147	51.6	31.6	0.5		
Om2	10-20	60	26					1.0	5.2	0.12	161	83.1	6.2	0.3		
Om3	20-55	88	46					3.0		0.17	140	44.8	30.1	0.4		
II Cg	55+															
Arlington (Typic Fibrisol) - Location: Portage N 46°40'17" W 64°04'30"																
Of1	0-22	91	80					6.0	3.0	0.05	131	6.6	11.1	0.8		
Of2	22-40	93	80					5.0	3.0	0.06	139	4.9	11.9	0.3		
Of3	40-100	95	88					5.0	3.0	0.09	134	5.7	11.4	0.3		
Of4	100-160	100	90					7.0	3.0	0.15	137	5.5	13.3	0.6		
Arlington (Typic Fibrisol) - Location: Black Banks Cove N 46°44'07" W 64°00'40"																
Of1	0-9	90	74	9.61	39.8	1.02	39	7.0	5.8	0.14	147	44.5	51.8	4.9	49.6	280
Of2	9-37	80	72	3.86	36.6	0.74	49	7.5	4.3	0.07	118	10.0	27.1	3.1	115.7	70
Of3	37-80	90	90	5.93	32.0	0.48	67	7.5	3.3	0.10	106	12.0	41.9	5.1	367.1	60
Of4	80-106	90	66	4.72	40.2	0.50	81	7.0	3.1	0.13	115	10.0	29.6	4.6	299.3	90
Of5	106+	82	62	7.42	31.3	0.38	81	7.5	3.2	0.12	98	14.0	55.9	6.2	299.3	80
Capevoy (Terric Mesisol) - Location: Riverton N 46°18'46" W 62°40'24"																
Om1	0-43	72	36					1.0	5.4	0.10	184	76.3	30.6	0.5		
Om2	43-80	67	24					1.0	5.5	0.12	157	62.9	30.9	0.3		
Of	80-100	76	46					4.0	5.3	0.10	116	39.2	25.9	0.3		
II Cg	100+															
Emmore (Terric Mesisol) - Location: Milo N 46°39'44" W 64°13'40"																
Om1	0-13	84	40					3.0	5.5	0.10	161	86.8	6.2	0.7		
Om2	13-32	84	44					1.0	5.4	0.15	104	31.9	26.2	0.3		
Om3	32-50	70	24					1.0	4.6	0.15	159	56.4	3.9	0.5		
II Cg	50+															
Frenchfort (Terric Mesisol) - Location: St. Andrews N 46°22'49" W 62°50'39"																
Of1	0-10	68	46	12.21	36.0	2.22	16	6.0	5.7	0.12	92	49.5	21.4	6.7	14.4	990
Of2	10-20	70	40	35.09	31.4	2.30	13	7.0	4.8	0.16	74	29.0	43.6		15.7	820
Om	20-120	74	38	16.13	36.4	2.43	15	7.0	4.3	0.16	129	46.5	49.3	8.5	14.4	630
Hazelbrook (Terric Mesisol) - Location: Cherry Hill N 46°22'52" W 62°48'00"																
Om1	0-25	41	25	23				3	5.4	0.32	105	87.0	36.3	6.4		
Om2	25-50	44	29	28				3	5.4	0.48	90	69.0	23.0	1.3		
II Cg	50+	Silt loam more than 30 cm thick, thin organic layer intermixed.														

Table 38. Analysis of organic soils of Prince Edward Island[1] (concluded)

		Fiber content			Total	Total		Pyro-	pH	Bulk		Elemental analyses[3]				
												meq/100 g				ppm
Horizon	Depth cm	Unrubbed %	Rubbed %	Ash %	C %	N %	C/N ratio	phosphate index	0.01M CaCl2	density g/cc	C.E.C.[2] meq/100 g	Ca	Mg	K	Na	P
Lake Verde (Terric Fibric Mesisol) - Location: Pisquid N 46°18'21" W 62°46'02"																
Om1	0-34	66	22					2	4.2	0.15	92	7.8	2.7	0.7		
Om2	34-44	72	32					1	4.3	0.12	51	5.2	8.2	0.2		
Of	44-71	81	65					5	4.0	0.10	133	13.8	4.4	0.3		
Cg	71+	Fine sandy loam till.														
Pisquid (Terric Humic Mesisol) - Location: Cardross N 46°17'22" W 62°37'42"																
Om1	0-15	70	36	7.51	43.7	1.15	38	5.5	3.0	0.08	110	4.5	8.2	4.8	7.8	500
Om2	15-79	76	12	2.19	51.8	1.06	49	1	3.0	0.14	133	4.5	9.9	0.3	7.4	360
Om3	79-94	74	18	1.65	52.7	1.09	48	6.0	2.9	0.10	123	2.0	4.1	0.1	7.0	120
Oh	94-116	36	6	2.50	45.6	2.37	19	1.5	3.1	0.14	137	1.5	2.5	0.2	7.0	460
II Cg	116+															
Pownal (Typic Mesisol) - Location: Cable Head N 46°26'29" W 63°33'12"																
Of	0-27	74	40	2.55	41.8	0.90	46	7.0	2.9	0.09	124	7.0	13.2	1.3	9.6	270
Om1	27-64	70	16	2.21	50.1	1.28	39	1.0	3.0		145	7.5	14.8	0.4	7.0	300
Om2	64-85	70	36	1.16	48.2	0.61	79		3.1	0.09	142	4.5	14.8	0.3	10.4	120
Om3	85-120	76	30	1.57	47.2	0.93	51	6.0	3.2	0.13	129	5.5	12.3	0.2	8.3	140

[1] Analysis by Service Laboratory, LRRC, Ottawa, except for Hazelbrook association determinations by Provincial Soil and Feed Test Laboratory.

[2] Cation Exchange Capacity by Barium acetate method. J. Assoc. Agric. Chem. 56:154-157. 1973.

[3] Elemental analyses extraction with 2N NaCl.

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights

Horizon	Depth cm	Gravel more than 2 mm	Sand Very coarse 2-1 mm	Sand Coarse 1-0.5 mm	Sand Medium 0.5-0.25 mm	Sand Fine 0.25-0.1 mm	Sand Very fine 0.1-0.05 mm	Sand Total 2-0.05 mm	Total silt 0.05-0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
						Alberry						
Ahe	0-5	0	6	4	22	18	11	61	26	13	2	SL
Ae	5-18	1	1	3	30	26	12	72	25	3	1	SL
Bf	18-33	8	1	3	24	25	12	65	28	7	2	FSL
BC1	33-53	21	1	3	23	26	13	66	30	4	1	GFSL
BC2	53-84	12	0	5	51	23	5	84	10	6	2	LS
C	84+	20	0	2	28	29	16	75	20	5	2	GSL
						Baptist Point						
Aeg	0-10	0.3	0.0	0.3	4.0	12.7	9.1	26.1	60.1	13.8	ND	SiL
Bg1	10-25	9.8	0.1	1.0	7.1	16.2	10.6	35.0	50.1	14.9	ND	SiL
Bg2	25-38	0.5	0.2	0.5	3.6	12.6	7.5	24.4	59.1	16.4	ND	SiL
C	38-100	0.6	0.1	0.2	5.5	14.1	8.2	28.1	55.9	16.0	ND	SiL
						Brackley						
Aegj	0-25	0	0.2	2.1	13.5	51.8	18.0	85.6	10.9	3.4	ND	LFS
Bhgj	25-33	0	0.1	2.6	20.3	58.8	9.1	90.8	3.3	5.9	ND	FS
Bmgj1	33-53	0	0.0	1.8	16.6	69.1	8.2	95.6	0.7	3.7	ND	FS
Bmgj2	53-75	0	0.3	1.3	7.1	38.1	31.9	78.7	16.7	4.6	ND	LS
IICgj	75+	5	0.7	2.2	9.3	40.9	16.0	69.2	18.3	12.5	ND	FSL
						Bunbury						
Ae	0-18	1	1	6	25	37	16	85	15	0	ND	LS
Bfcj1	20-33	5	1	8	26	36	13	84	11	5	ND	LS
Bfcj2	33-50	11	2	14	37	21	6	80	17	3	ND	LS
BC1 + BC2	50-101	22	1	8	20	24	22	75	21	4	ND	GLS
C	101+	20	2	13	37	22	7	81	16	3	ND	GLS
						Carey Point						
Apgj	0-15	0	0.3	1.5	26.2	48.2	6.9	83.1	12.1	4.8	ND	LS
Aegj	15-29	2	0.4	0.9	25.7	53.9	3.1	84.0	10.0	6.0	ND	LFS
Bmgj	29-70	6	0.3	0.9	22.4	64.2	2.3	90	6.7	3.2	ND	FS
Cgj	70-100	2	0.1	0.4	24.7	66.0	2.2	93.4	3.6	3.0	ND	FS
						Charlottetown						
Ae1	0-5	11	0.0	1.1	4.9	31.6	20.1	57.7	36.7	5.6	1.4	FSL
Ae2	5-10	10	0.0	1.1	5.1	28.4	17.6	52.2	38.1	9.7	1.0	FSL
Bf1	10-15	22	0.2	0.6	4.5	28.9	18.5	52.7	37.9	9.4	1.3	GFSL
Bfj1	15-20	34	1.3	1.7	5.9	28.3	16.9	54.1	36.7	9.2	3.2	GFSL
Bfj2	20-25	29	1.3	1.3	5.1	28.4	18.7	54.8	36.0	9.2	ND	GFSL
Bfj3	25-30	19	1.6	2.0	5.2	28.7	17.7	55.2	35.2	9.6	ND	FSL
Bm1	30-45	25	1.0	1.8	5.7	27.2	18.5	54.2	36.6	9.2	ND	GFSL
Bm2	45-60	40	1.2	1.7	5.2	27.2	16.9	52.2	36.4	11.4	3.8	GFSL
Btj1	60-91	23	1.1	1.6	5.3	26.6	18.1	52.7	34.2	13.1	4.6	GFSL
Btj2	91-122	20	1.2	1.9	5.6	24.9	16.8	50.4	35.4	14.2	ND	GL
Btj3	122-163	17	1.4	2.8	6.4	26.8	15.6	53.0	33.5	13.5	ND	FSL
C	163+	25	0.7	1.6	5.8	26.7	16.5	51.3	34.7	13.9	ND	GL

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights (continued)

Horizon	Depth cm	Gravel more than 2 mm	Sand: Very coarse 2–1 mm	Sand: Coarse 1–0.5 mm	Sand: Medium 0.5–0.25 mm	Sand: Fine 0.25–0.1 mm	Sand: Very fine 0.1–0.05 mm	Sand: Total 2–0.05 mm	Total silt 0.05–0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
						Crapaud						
Ap	0–18	3	0.5	1.1	13.5	35.2	13.7	64.0	31.2	4.8	ND	FSL
Aegj	18–22	1	0.0	0.5	15.8	40.6	15.4	72.3	25.3	2.4	ND	FSL
Bmgj	22–40	15	0.5	1.2	14.7	37.0	12.9	66.3	27.7	6.0	ND	FSL
Bm	40–90	17	0.8	2.1	16.2	34.1	13.8	67.0	27.4	5.6	ND	FSL
C	90+	22	0.3	1.4	15.7	38.2	15.6	71.2	22.4	6.4	ND	GFSL
						Culloden						
Ap	0–20	0	0.4	0.3	8.2	50.8	27.4	87.1	10.4	2.5	2.2	FS
Ae	20–33	0	0.0	0.1	7.0	52.7	28.6	88.4	11.3	0.3	0.2	FS
Bfcj	33–46	0	0.0	0.2	6.5	51.9	33.7	92.3	5.8	1.9	1.2	FS
Bm	46–61	0	0.0	0.2	5.4	47.8	37.2	90.6	6.4	3.0	1.1	FS
C	61+	12	1.9	2.3	15.7	36.8	12.6	69.3	24.4	6.3	2.9	FSL
						Dunblane						
Ap	0–18	1	0.3	1.0	6.2	16.3	21.1	44.9	37.1	18.0	ND	L
Bm1	18–30	2	0.1	0.4	3.5	13.6	24.7	42.3	43.6	14.1	ND	L
Bm2	30–50	1	0.1	0.2	2.3	12.8	25.7	41.1	44.1	14.8	ND	L
Bm3	50–75	0	0.0	0.0	0.5	2.9	15.5	18.9	60.7	20.4	ND	SiL
C1	75–100	0	0.0	0.0	0.3	1.9	21.4	23.6	58.4	18.0	ND	SiL
C2	100–120	0	0.0	0.0	0.2	2.1	17.2	19.5	64.9	15.6	ND	SiL
						Dunstaffnage						
Ap	0–20	13	0.5	1.8	21.8	36.1	11.8	72.0	25.5	2.5	ND	FSL
Ae	discontinuous	ND	0.0	1.3	29.1	41.7	10.3	82.4	16.2	1.3	ND	LS
Bf	20–30	9	1.7	3.0	29.6	35.0	9.2	78.5	21.5	0.0	ND	LS
Bm	30–59	ND	2.4	3.2	45.4	31.7	7.4	90.1	9.9	0.0	ND	S
C1	59–90	1	1.0	3.9	59.1	27.8	4.0	95.8	4.2	0.0	ND	S
						Duvar						
Aegj1	0–8	5	0	3	12	19	26	60	33	7	1	FSL
Aegj2	8–12											
Aegj3	12–17	5	1	4	14	27	15	61	28	11	3	FSL

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights (continued)

			Sand									
Horizon	Depth cm	Gravel more than 2 mm	Very coarse 2–1 mm	Coarse 1–0.5 mm	Medium 0.5–0.25 mm	Fine 0.25–0.1 mm	Very fine 0.1–0.05 mm	Total 2–0.05 mm	Total silt 0.05–0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
ABgj	17–24											
Bt1	24–32	6	0	2	9	19	14	44	41	15	4	L
Bt	44–67	6	0	2	9	21	12	44	40	16	4	L
C1	95–120	5	0	2	8	23	12	45	35	20	5	L
C2	120–165		0	2	12	36	11	61	22	17	5	FSL
						Egmont						
Apg	0–15	1	3	1	8	15	10	37	38	25	8	L
Bg	15–25	1	1	2	9	21	10	43	34	23	7	L
Btg	25–56	2	1	2	6	13	9	31	40	29	8	CL
Btgk	56–71	11	0	0	0	1	0	1	43	56	8	SiC
BCk	71–91	6	1	1	0	1	0	3	54	43	8	SiC
Ck	91–132	5	1	0	0	1	0	2	55	43	6	SiC
						Bayvale						
Ap	0–15	8	0.1	0.9	5.7	19.1	14.5	40.3	45.8	13.9	ND	L
Bm1	17–30	10	0.0	0.3	3.8	18.0	15.4	37.5	44.5	18.0	ND	L
Bm2	30–45	59	0.0	0.2	2.0	14.2	23.9	40.3	38.9	20.8	ND	GL
R	45+	sandstone bedrock										
						Fifteen Point						
Ap	0–13	4	0.7	0.4	3.6	15.4	17.4	37.5	46.1	16.4	5.7	L
Bm	15–20	3	0.5	0.9	3.4	15.4	16.8	37.0	46.7	16.3	5.6	L
Bt1	20–28	3	0.4	0.4	3.5	16.9	20.1	41.3	43.5	15.2	3.8	L
Bt2	28–40	1	0.1	0.3	3.2	14.3	15.5	33.4	41.2	25.4	9.8	L
Bt3	40–76	4	0.0	0.3	3.1	15.2	14.6	33.2	41.5	25.3	8.0	L
C	76+	2	0.1	0.3	2.4	12.3	14.8	29.9	48.5	21.6	6.9	L
						Gowanbrae						
Ap	0–24	2	0.0	0.6	15.2	39.4	11.6	66.8	23.2	10.0	ND	FSL
Ae	24–28	1	0.0	0.2	13.2	46.5	13.9	73.8	21.4	4.8	ND	FSL
Bf	28–36	4	0.3	1.3	13.8	42.0	11.7	69.1	22.6	8.3	ND	FSL
Bm1	36–54	10	0.0	0.2	10.4	37.5	14.6	62.7	31.3	6.0	ND	FSL
Bm2	54–80	7	0.0	0.2	9.9	32.9	13.2	56.2	30.8	13.0	ND	FSL
IIC	80–100	15	0.0	0.1	7.9	35.8	14.4	58.2	24.0	17.8	ND	FSL
						Haliburton						
Ap	0–16	7	2.8	3.6	12.3	24.6	14.4	57.7	29.9	12.4	ND	SL
Bf	16–36	14	1.1	3.5	38.7	21.9	6.9	72.1	19.9	8.0	ND	SL
Bm	36–55	10	0.2	3.3	39.5	19.4	6.9	69.4	21.4	9.2	ND	SL
C	55+	soft sandstone bedrock										

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights (continued)

Horizon	Depth cm	Gravel more than 2 mm	Sand						Total silt 0.05–0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
			Very coarse 2–1 mm	Coarse 1–0.5 mm	Medium 0.5–0.25 mm	Fine 0.25–0.1 mm	Very fine 0.1–0.05 mm	Total 2–0.05 mm				
						Haliburton Brook						
Ap	0–18	0	0.1	2.6	29.2	32.8	10.5	75.2	17.9	6.9	0.8	SL
Bm1	18–28	3	0.4	2.2	28.2	40.4	10.2	81.4	12.6	6.0	1.6	LS
Bm2	28–36	2	0.1	2.6	28.2	30.0	13.3	74.2	17.4	8.4	2.8	SL
BC1	36–51	1	0.2	1.2	14.1	24.9	17.3	57.7	31.5	10.8	4.6	FSL
BC2	51–96	0	0.0	0.6	9.4	24.8	23.5	58.3	32.1	9.6	3.6	FSL
C	96+	14	0.0	0.4	19.0	39.0	15.6	74.0	16.7	9.3	3.6	FSL
						Kildare						
Ap	0–18	11	1	6	35	23	8	73	19	8	2	SL
Ae	18–25	4	0	5	39	24	9	77	19	4	1	LS
Bf	25–38	12	0	6	40	22	7	75	14	11	4	SL
Bmcj	38–61	18	1	8	37	28	7	81	14	5	2	LS
BC	61–109	25	1	6	28	40	8	83	12	5	1	GLS
C	109+	9	0	2	26	58	8	94	5	1	0	FS
						Locke Road						
Apg	0–18	0	0.1	0.6	4.2	7.6	4.1	16.6	54.0	29.4	ND	SiCL
Bg1	18–30	0	0.0	0.5	7.2	11.7	4.4	23.8	48.2	28.0	ND	CL
Bg2	30–60	0	0.2	0.3	4.1	7.4	3.2	15.2	57.4	27.4	ND	SiCL
C1	60–100	0	0.2	0.3	2.5	4.5	1.9	9.4	62.4	28.2	ND	SiCL
C2	100–120	0	0.1	0.1	1.1	2.8	4.8	8.9	66.6	24.5	ND	SiL
						Malpeque						
Aegj	0–18	0	0.0	0.0	6.4	50.9	19.1	76.4	17.7	5.9	2.0	FSL
Bfgj	18–25	6	0.0	1.7	9.1	48.5	15.2	74.5	11.9	13.6	8.0	FSL
Bmgj1	25–38	18	0.2	1.0	8.3	54.9	14.4	78.8	14.7	6.5	2.4	LFS
Bmgj2	38–61	30	0.1	0.3	12.8	18.9	12.2	44.3	38.5	17.2	7.9	GL
BC	61–86	25	0.7	1.6	6.3	22.4	15.4	46.4	34.5	19.1	5.8	GL
C	86+	25	1.5	2.1	7.9	34.7	12.1	58.3	27.1	14.6	7.0	GFSL
						Margate						
Ae	0–5	3	0	3	8	17	13	41	50	9	2	L
Aeg	5–10		0	3	8	12	16	39	46	15	3	L
ABg	10–16	7	0	2	6	16	11	35	45	20	4	L
Btgj1	16–22	5	1	2	5	14	11	33	47	20	5	L
Btgj2	22–40	5	1	2	9	21	13	46	37	17	4	L
Bt3	40–60	5	1	2	5	15	11	34	47	19	4	L
BC	80–100	9	0	1	5	15	12	33	48	19	4	L
C1	100–142	10	0	1	4	17	11	33	49	18	4	L
Ck	142–190	10	1	2	4	14	11	32	50	18	4	L

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights (continued)

			Sand									
Horizon	Depth cm	Gravel more than 2 mm	Very coarse 2–1 mm	Coarse 1–0.5 mm	Medium 0.5–0.25 mm	Fine 0.25–0.1 mm	Very fine 0.1–0.05 mm	Total 2–0.05 mm	Total silt 0.05–0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
						Mossy Point						
Aeg	0–20	1	1	2	6	22	11	42	33	25	10	L
Bg1	20–35	1	0	0	3	28	18	49	29	22	7	L
Bg2	35–50	22	2	4	20	35	11	72	20	8	3	GFSL
IICkj	50+	15	0	2	21	43	13	79	14	7	3	LS
						Munn Road						
Ahegj	0–10	1	0	0	6	19	10	35	45	20	4	L
Bmgj1	10–31	1	0	1	19	63	9	92	7	1	0	FS
C1	45–75	1	0	0	8	21	12	41	39	20	6	L
C2	75+	13	1	3	15	34	17	70	24	6	2	LS
						Newton						
Ap	0–20	1	2	9	35	28	8	82	16	2	1	LS
Ae	20–25	1	1	7	31	30	11	80	18	2	0	LS
Bf	25–51	1	0	4	18	50	17	89	8	3	0	FS
Bm	51–59	1	0	1	4	38	36	79	19	2	1	LS
IIC1	59–127	1	0	0	2	6	12	20	62	18	4	SiL
IIC2	127+	5	0	0	1	2	2	5	70	25	5	SiL
						O'Leary						
Ap	0–20	3	0.5	1.6	10.1	23.9	12.0	48.1	38.8	13.1	2.3	L
Bm	20–29	4	1.4	1.9	11.0	21.8	11.5	47.7	37.2	15.1	5.5	L
Bt1	29–56	4	0.9	1.8	11.2	17.0	11.1	42.0	40.4	17.6	7.4	L
Bt2	56–90	3	0.4	0.7	8.2	25.0	14.3	48.6	32.9	18.5	5.3	L
C	90+	2	0.1	0.6	8.2	26.2	13.8	48.9	32.7	18.4	4.9	L
						Orwell						
Apg	0–18	1	0.1	0.6	9.7	33.1	16.6	60.1	31.4	8.5	2.6	FSL
Aeg	18–25	6	0.1	0.8	8.6	31.4	16.5	57.4	36.6	6.0	2.7	FSL
Bg	25–48	9	0.9	1.9	7.1	27.4	17.5	54.8	38.6	6.6	4.3	FSL
BCgj	48–90	21	0.7	1.9	9.5	23.7	10.6	46.3	46.1	7.6	4.1	GFSL
Cgj	90+	10	1.2	2.3	13.8	31.4	11.4	60.1	31.4	8.5	2.8	FSL
						Salt Grass Point						
Ap	0–15	0	0.2	0.8	13.6	44.2	17.2	76.0	15.6	8.4	3.2	FSL
Aegj	15–23	2	0.0	0.5	14.7	48.8	12.5	76.5	16.0	7.5	3.5	FSL
Bm	23–53	6	0.1	0.1	5.7	43.3	18.2	67.4	17.2	15.4	4.1	FSL
Ck	53–100	7	1.3	1.8	11.3	39.0	15.6	69.0	18.2	12.8	4.2	FSL

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights (continued)

			Sand									
Horizon	Depth cm	Gravel more than 2 mm	Very coarse 2-1 mm	Coarse 1-0.5 mm	Medium 0.5-0.25 mm	Fine 0.25-0.1 mm	Very fine 0.1-0.05 mm	Total 2-0.05 mm	Total silt 0.05-0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
Tignish												
Ahe	0-10	0	1	0	5	20	20	46	42	12	2	L
Ae1	10-18	0	0	1	5	22	22	50	43	7	1	L
Ae2	18-28	0	0	1	4	20	22	47	43	10	2	L
Bf	28-38	0	0	1	5	18	18	42	42	16	4	L
Bt1	38-51	0	0	1	6	17	18	42	42	16	5	L
Bt2	51-70	0	0	1	5	17	18	41	41	18	5	L
BC2	92-120	0	0	2	7	20	16	45	41	14	4	L
C	137-152	0	0	1	4	21	13	39	44	17	4	L
Uigg												
Apgj	0-12	1	0.5	1.4	17.5	45.1	15.3	79.8	16.1	4.1	1.3	LFS
Aegj	12-23	0	0.1	0.9	14.5	48.2	17.7	81.4	14.3	4.3	2.0	LFS
Bmgj	30-66	24	2.4	5.7	31.4	43.1	8.2	90.9	6.4	2.7	2.5	GS
BC	66-100	29	1.2	3.3	23.6	40.5	10.9	79.5	16.0	4.5	3.0	GLS
IIC	100+	not sampled										
West Point												
Ap	0-17	2	0.9	2.2	9.0	18.4	11.1	41.6	42.0	16.4	ND	L
Bmgj1	17-30	10	0.8	2.4	7.0	14.6	9.6	34.4	49.3	16.3	ND	L
Bmgj2	30-60	7	0.3	0.5	3.1	10.8	9.2	23.9	57.3	18.8	ND	SiL
C	60-100	6	0.1	0.2	2.1	7.5	7.3	17.2	69.0	13.8	ND	SiL
Winsloe												
Aeg1	0-13	1.5	0.7	1.4	11.3	35.1	11.0	59.5	35.1	5.4	ND	FSL
Aeg2	13-24	5.2	0.1	1.3	13.0	37.5	11.4	63.3	25.9	10.8	ND	FSL
Bg	24-39	9.5	0.6	1.6	10.1	29.2	10.2	51.7	37.4	10.9	ND	L
C	76+	9.1	0.2	1.3	10.1	30.1	9.5	51.2	36.0	12.8	ND	L
Wolfe Inlet												
Ahe	0-2	0	0.3	0.3	3.4	7.7	5.7	17.4	57.0	25.6	10.7	SiL
Aegj	2-13	1	1.2	1.9	17.1	37.4	13.8	71.4	18.9	9.7	4.8	FSL
ABgj	13-20	0	1.0	1.9	16.0	33.8	13.4	66.1	20.5	13.4	5.4	FSL
Bt	20-30	0	0.1	0.9	9.0	25.0	12.5	47.5	30.3	22.2	9.3	L
Btgj	30-56	0	0.0	0.0	0.4	1.5	2.3	4.2	51.8	44.0	21.0	SiC
BCk	56-78	0	0.1	0.1	0.0	1.1	3.4	4.7	48.1	47.2	17.2	SiC
IICk	78+	0	1.5	1.2	0.5	0.5	6.9	10.7	69.0	20.3	7.8	SiL

Table 39. Particle size analyses of mineral soil profiles as percentages of oven dry weights (concluded)

			Sand									
Horizon	Depth cm	Gravel more than 2 mm	Very coarse 2-1 mm	Coarse 1-0.5 mm	Medium 0.5-0.25 mm	Fine 0.25-0.1 mm	Very fine 0.1-0.05 mm	Total 2-0.05 mm	Total silt 0.05-0.002 mm	Total clay less than 0.002 mm	Fine less than 0.001 mm	Texture
						Wood Island						
Aeg	0-10	2	0.0	0.3	10.8	61.3	8.8	81.2	16.4	2.4	0.4	LFS
Bhgj	15-25	1	0.0	0.3	15.1	52.8	7.1	75.3	19.4	5.3	1.6	LFS
Bfjc	25-43	1	0.0	0.2	9.0	85.0	2.4	96.6	2.1	1.3	1.2	FS
BOgj	43-58	0	0.2	0.7	8.1	59.0	15.3	83.3	15.4	1.3	1.0	LFS
C1	58-72	8	0.4	1.1	13.5	41.0	15.5	71.5	18.3	10.2	6.4	FSL
C2	72-152	14	0.0	1.3	17.0	45.9	12.5	76.7	15.1	8.2	3.3	FSL

NOTE: ND = not determined.

Table 40. Chemical properties of mineral soil profiles as percentages of oven dry weights

	Depth	pH		Carbon	Oxalate		Dithionite		Available ppm			Neutral salt extra. meq/100 g			Exch. capacity meq/100 g	
					Fe	Al	Fe	Al								
Horizon	cm	H_2O	$CaCl_2$	%	%	%	%	%	Ca	K	P	(Ca + Mg)	K	Al	P. charge	CaOAc
									Alberry							
Ahe	0–5	4.5	5.4	4.50	0.40	0.25	1.04	0.21	150	38	70	0.71	0.31	0.65	1.67	15.9
Ae	5–18	4.6	4.9	0.01	0.10	0.08	0.45	0.07	25	16	25	0.06	0.08	0.41	0.55	14.2
Bf	18–33	5.7	4.7	1.00	0.41	0.44	1.15	0.35	37	17	53	0.11	0.10	0.28	0.49	2.7
BC1	33–53	5.6	4.7	TR	0.16	0.38	1.04	0.27	50	17	11	0.28	0.14	0.11	0.53	1.8
BC2	53–84	5.7	4.8	ND	0.08	0.21	0.99	0.16	62	21	112	0.53	0.10	0.05	0.68	2.9
C	84+	5.6	5.0	ND	0.05	0.06	1.04	0.05	225	41	98	1.31	0.15	0.02	1.48	5.0
									Baptist Point							
Aeg	0–10	ND	3.2	1.55	0.05	0.11	0.08	0.07	75	25	22	0.48	0.07	5.89	6.44	12.5
Bg1	10–25	ND	3.8	0.19	0.39	0.08	1.35	0.07	100	17	39	0.59	0.05	2.89	3.53	5.2
Bg2	25–38	ND	4.0	0.00	0.17	0.06	1.21	0.05	450	29	130	1.87	0.08	2.02	3.97	4.5
C	38–100	ND	5.3	0.11	0.05	0.03	1.20	0.15	825	42	252	4.93	0.10	0.22	5.25	6.7
									Brackley							
LFH	8–0	ND	2.9	29.7	0.16	0.13	0.35	0.13	564	433	14	10.24	1.29	5.33	16.86	ND
Aegj	0–25	ND	3.3	0.27	0.01	0.12	0.04	0.03	44	23	4	0.19	0.05	0.78	1.02	2.2
Bhgj	25–33	ND	3.8	4.84	0.65	1.34	0.79	1.36	52	27	4	0.61	0.12	5.10	5.83	28.4
Bmgj1	33–53	ND	4.2	0.54	0.34	0.31	0.54	0.31	40	16	15	0.13	0.03	0.47	0.63	6.0
Bmgj2	53–75	ND	4.2	0.35	0.21	0.34	0.58	0.27	40	20	42	0.12	0.04	0.56	0.72	4.7
IICgj	75+	ND	3.9	0.06	0.08	0.15	1.03	0.13	60	51	68	0.26	0.09	3.84	4.19	7.7
									Bunbury							
Ae	0–18	4.2	3.6	0.07	0.10	0.04	0.30	0.05	25	23	18	0.13	0.09	0.06	0.28	1.4
Bfcj1	20–33	4.7	4.0	1.20	0.40	0.90	1.0	1.00	10	21	36	0.14	0.12	0.11	0.37	2.2
Bfcj2	33–50	5.2	4.3	0.50	0.20	0.60	1.0	0.70	13	19	105	0.09	0.12	0.09	0.29	1.9
BC2	75–101	5.2	4.3	TR	0.05	0.09	0.70	0.10	5	21	28	0.08	0.09	0.20	0.37	2.2
C	101+	5.0	4.4	ND	0.05	0.07	0.70	0.10	20	25	49	0.14	0.12	0.20	0.26	2.5
									Carey Point							
Apgj	0–15		4.1	1.06	0.08	0.06	0.16	0.05	200	29	22	1.44	0.08	0.62	2.14	5.2
Aegj	15–29		4.4	0.19	0.02	0.03	0.04	0.00	250	13	13	1.45	0.04	0.36	1.85	2.9
Bmgj	29–70		5.0	0.52	0.35	0.35	0.60	0.37	175	17	17	0.99	0.06	0.19	1.2	4.3
Cgj	70–100		5.6	0.19	0.01	0.01	0.07	0.04	300	65	65	1.15	0.04	0.11	1.3	2.0
									Charlottetown							
Ae1	0–5		4.1	0.41	0.01	0.04	0.26	0.01	ND	ND	ND	ND	ND	ND	ND	ND
Ae2	5–10		ND	0.23	0.02	0.12	0.62	0.44	130	35	16	2.58	ND	0.22	2.80	4.9
Bf1	10–15		ND	2.55	0.06	0.32	0.88	0.35	ND	ND	ND	ND	ND	ND	ND	ND
Bfj1	15–20		ND	2.44	0.27	0.64	0.96	0.29	ND	ND	ND	ND	ND	ND	ND	ND
Bfj2	20–25		4.1	1.62	0.27	0.64	0.92	0.26	63	45	49	2.21	ND	2.55	4.76	13.9
Bfj3	25–30		4.1	0.81	0.23	0.60	0.80	0.20	20	66	35	2.52	ND	2.44	4.96	5.8
Bm1	30–45		4.1	0.69	0.13	0.36	0.72	0.08	30	104	35	2.59	ND	1.99	4.58	8.3
Bm2	45–60		ND	ND	0.07	0.21	0.73	0.06	ND	ND	ND	ND	ND	ND	ND	ND

Table 40. Chemical properties of mineral soil profiles as percentages of oven dry weights (continued)

	Depth	pH		Carbon	Oxalate		Dithionite		Available ppm			Neutral salt extra. meq/100 g			Exch. capacity meq/100 g	
Horizon	cm	H_2O	$CaCl_2$	%	Fe %	Al %	Fe %	Al %	Ca	K	P	(Ca + Mg)	K	Al	P. charge	CaOAc
									Crapaud							
Ap	0–18		5.8	1.1	0.63	0.40	1.97	0.43	330	17	35	2.53	0.43	0.17	3.13	7.0
Aegj	18–22		5.8	0.1	0.03	0.03	0.48	0.04	54	10	22	0.42	0.14	0.14	0.70	2.1
Bmgj	22–40		5.8	1.3	0.39	0.18	1.43	0.29	472	26	23	3.90	0.16	0.02	4.08	7.5
Bm	40–90		5.5	0.2	0.06	0.26	1.70	0.25	72	21	44	0.11	0.01	0.55	0.67	3.3
C	90+		5.5	TR	0.12	0.22	1.45	0.29	100	17	44	0.26	0.01	0.16	0.43	3.2
									Culloden							
Ap	0–20		4.1	1.22	0.26	0.24	0.50	0.12	25	35	53	0.70	ND	0.53	1.23	2.4
Ae	20–33		4.2	0.03	0.01	0.02	0.18	0.01	15	12	25	0.43	ND	0.09	0.51	0.8
Bfcj	33–46		4.0	2.50	0.53	1.14	1.05	1.00	20	16	60	0.55	ND	0.50	1.05	4.8
Bm	46–61		4.1	0.56	0.45	0.34	0.83	0.23	20	20	169	0.61	ND	0.50	1.11	2.4
C	61+		4.1	ND	0.03	0.14	0.63	0.06	135	45	91	1.12	ND	0.33	1.45	2.4
									Dunblane							
Ap	0–18		5.2	2.06	0.53	0.24	1.11	0.24	950	29	22	6.16	0.07	0.00	6.23	9.3
Bm1	18–30		4.7	0.42	0.29	0.20	1.10	0.17	325	13	48	1.93	0.04	0.32	2.29	5.3
Bm2	30–50		4.3	0.24	0.20	0.15	1.12	0.11	200	13	87	1.09	0.04	1.12	2.25	4.5
Bm3	50–75		3.9	0.25	0.15	0.11	1.45	0.09	125	29	130	0.82	0.08	3.59	4.49	6.5
C1	75–100		3.9	0.17	0.14	0.11	1.30	0.09	100	29	130	0.67	0.08	2.70	3.45	6.1
C2	100–120		3.9	0.11	0.19	0.09	1.37	0.09	100	42	135	0.58	0.10	3.19	3.87	5.9
									Dunstaffnage							
Ap	0–20		5.5	1.53	0.26	0.16	0.75	0.15	564	433	14	5.24	0.18	ND	5.42	7.9
Ae	discontinuous		5.1	0.19	0.02	0.00	0.28	0.03	44	23	4	1.66	0.04	ND	1.70	2.6
Bf	20–30		5.3	1.21	0.38	0.89	0.98	0.57	52	27	4	4.36	0.07	ND	4.43	8.6
Bm	30–59		5.2	0.43	0.07	0.26	0.44	0.21	40	16	15	1.55	0.06	ND	1.61	4.3
C1	59–90		4.9	0.09	TR	0.07	0.23	0.06	40	20	42	0.34	0.04	ND	0.38	2.1
C2	90+		4.7	0.09	TR	0.08	0.21	0.06	60	51	68	0.33	0.04	ND	0.37	1.8
									Duvar							
LFH	5–0		3.7	24.80	ND	ND	ND	ND	ND	ND	ND	11.0	ND	0.4	11.4	61.7
Aegj1	0–8		3.8	0.4	0.06	0.10	0.15	0.15	ND	ND	ND	1.9	ND	2.3	4.2	13.5
Aegj2	8–12		4.0	0.4	0.11	0.13	0.27	0.15	40	20	16	1.5	ND	3.1	4.6	ND
Aegj3	12–17		4.0	0.4	0.28	0.15	0.68	0.20	ND	ND	ND	1.5	ND	2.3	3.8	ND
ABgj	17–24		4.1	0.5	0.27	0.24	1.1	0.18	40	27	39	1.4	ND	2.0	3.4	6.6
Bt1	24–32		4.2	0.4	0.39	0.30	1.6	0.42	ND	ND	ND	1.3	ND	1.2	2.5	ND
Bt2	32–44		4.1	0.1	0.17	0.20	1.7	0.29	110	31	116	1.5	ND	1.7	3.2	ND
Bt3	44–67		4.1	0.0	0.11	0.13	1.5	0.26	ND	ND	ND	2.3	ND	1.7	4.0	6.6
BC	67–95		4.3	0.0	0.10	0.10	1.4	0.20	1850	57	264	3.2	ND	0.7	3.9	ND
C1	95–120		4.3	0.0	0.07	0.09	1.7	0.11	ND	ND	ND	4.3	ND	0.5	4.8	10.3

Table 40. Chemical properties of mineral soil profiles as percentages of oven dry weights (continued)

Horizon	Depth	pH		Carbon	Oxalate		Dithionite		Available ppm			Neutral salt extra. meq/100 g			Exch. capacity meq/100 g	
	cm	H2O	CaCl2	%	Fe %	Al %	Fe %	Al %	Ca	K	P	(Ca + Mg)	K	Al	P. charge	CaOAc
Egmont																
Apg	0-15		5.7	4.05	0.83	0.28	2.13	0.23	2000	68	31	25.2	1.1	0.0	26.3	31.1
Bg	15-25		6.9	0.10	0.18	0.08	1.80	0.08	1575	62	281	13.7	0.5	0.0	14.2	13.8
Btg	25-56		7.2	0.05	0.12	0.07	2.06	0.09	1700	81	286	14.8	0.7	0.0	15.5	14.9
Btgk	56-71		7.3	ND	0.06	0.07	2.56	0.08	2000+	145	330	20.7	0.6	0.0	21.3	19.3
BCk	71-91		7.3	ND	0.07	0.06	2.68	0.08	2000+	143	330	19.6	0.6	0.0	20.2	20.8
Ck	91-132		7.3	ND	0.06	0.06	3.03	0.06	2000+	153	316	18.8	0.8	0.0	19.6	27.5
Emyvale																
Ap	0-15		4.6	1.45	0.44	0.28	1.28	0.25	675	79	109	3.70	0.17	0.30	4.17	8.9
Ae	15-17	not sampled														
Bm1	17-30		3.9	0.65	0.45	0.20	1.46	0.16	175	54	48	1.02	0.11	0.11	1.24	8.6
Bm2	30-45		4.0	0.67	0.35	0.32	1.57	0.32	100	63	196	0.64	0.13	0.13	0.90	10.0
R	45+	sandstone bedrock														
Fifteen Point																
Ap	0-13		4.4	1.90	0.52	0.32	1.05	0.17	937	115	113	5.78	ND	0.21	5.99	10.0
Bm	15-20		4.2	1.10	0.52	0.45	1.13	0.35	237	37	194	2.41	ND	0.80	3.21	6.0
Bt1	20-28		4.0	0.41	0.27	0.24	1.10	0.19	125	41	81	0.97	ND	1.09	2.06	4.0
Bt2	28-40		3.9	0.05	0.15	0.17	1.55	0.14	175	66	88	2.40	ND	2.39	4.79	5.6
Bt3	40-76		3.7	ND	0.08	0.13	1.50	0.14	137	70	141	2.71	ND	2.61	5.32	5.6
C	76+		3.7	ND	0.06	0.16	1.65	0.11	145	82	158	2.75	ND	2.77	5.52	5.6
Gowanbrae																
Ap	0-24		4.7	2.29	0.36	0.22	0.91	0.22	550	92	170	4.00	0.20	0.35	4.55	11.9
Ae	24-28		3.9	0.23	0.07	0.06	0.43	0.06	50	13	30	0.17	0.04	0.99	1.20	2.3
Bf	28-36		4.1	1.53	0.91	0.56	1.63	0.56	50	29	35	0.28	0.07	1.04	1.39	9.7
Bm1	36-54		4.5	0.53	0.13	0.40	0.82	0.40	25	25	44	0.15	0.07	0.42	.64	4.7
Bm2	54-80		4.2	0.15	0.03	0.20	0.91	0.20	25	33	35	0.16	0.08	0.76	1.00	3.5
IIC	80-100		4.0	0.00	0.02	0.10	1.02	0.10	25	33	83	0.19	0.09	0.96	1.24	4.0
Haliburton																
Ap	0-16		4.4	1.50	0.39	0.23	1.30	0.23	400	50	26	2.55	ND	0.47	3.02	9.3
Bf	16-36		4.5	1.23	0.38	0.58	1.35	0.71	150	21	30	1.13	ND	0.35	1.48	9.0
Bm	36-55		4.7	0.65	0.12	0.47	1.12	0.51	75	17	52	0.64	ND	0.19	0.83	4.4
C	55+	Soft sandstone bedrock														
Haliburton Brook																
Ap	0-18		6.0	1.51	0.27	0.25	0.89	0.11	725	49	28	4.75	ND	0.0	4.75	8
Bm1	18-28		6.0	0.64	0.30	0.25	0.86	0.05	425	27	32	3.14	ND	0.0	3.14	7
Bm2	28-36		6.2	0.34	0.06	0.12	0.70	0.06	500	31	32	3.21	ND	0.0	3.21	9
BC1	36-51		6.0	ND	0.03	0.08	0.98	0.05	762	33	56	4.35	ND	0.0	4.35	11
BC2	51-96		5.9	ND	0.04	0.08	0.86	0.04	937	61	81	5.08	ND	0.0	5.08	13
C	96+		6.3	ND	0.05	0.05	0.82	0.04	1300	47	67	6.22	ND	0.0	6.22	13

Table 40. Chemical properties of mineral soil profiles as percentages of oven dry weights (continued)

Horizon	Depth	pH		Carbon	Oxalate		Dithionite		Available			Neutral salt extra. meq/100 g			Exch. capacity meq/100 g	
					Fe	Al	Fe	Al	ppm							
	cm	H_2O	$CaCl_2$	%	%	%	%	%	Ca	K	P	(Ca + Mg)	K	Al	P. charge	CaOAc
Kildare																
Ap	0–18		4.5	1.70	0.36	0.33	1.28	0.24	175	62	60	1.2	0.1	0.6	1.9	5.7
Ae	18–25		4.8	0.12	0.11	0.07	0.75	0.05	400	20	39	0.6	0.1	0.1	0.8	3.9
Bf	25–38		4.6	1.40	0.50	0.40	1.64	0.61	200	29	330	1.8	0.2	0.3	2.3	4.9
Bmcj	38–61		4.8	0.05	0.09	0.42	1.15	0.30	60	17	180	2.0	0.1	0.1	2.2	1.4
BC	61–109		4.9	ND	0.06	0.12	1.03	0.10	300	23	42	1.6	0.1	0.05	1.8	2.7
C	109+		5.1	ND	0.05	0.05	0.65	0.05	200	17	60	1.2	0.1	0.05	1.4	1.8
Locke Road																
Apg	0–18		5.2	1.97	0.42	0.11	1.20	0.11	2150	50	44	13.33	0.08	0.0	13.41	17.5
Bg1	18–30		5.7	0.17	0.16	0.06	1.79	0.11	1800	42	48	9.78	0.06	0.0	9.84	10.1
Bg2	30–60		5.7	0.17	0.11	0.05	2.14	0.10	1625	42	74	9.26	0.07	0.0	9.33	9.9
C1	60–100		5.7	0.11	0.08	0.05	1.92	0.08	1525	50	83	9.18	0.09	0.0	9.27	10.1
C2	100–120		5.7	0.06	0.08	0.05	1.79	0.05	1400	58	87	7.99	0.10	0.0	8.09	9.0
Malpeque																
LH	5–0		3.4	ND	ND	ND	0.50	0.24				9.73	ND	5.88	15.61	76.8
Aegj	0–18		4.0	0.10	0.04	0.07	0.19	0.05	20	20	18	2.39	ND	2.00	4.39	5.6
Bfgj	18–25		4.2	1.75	0.70	0.96	1.30	0.80	30	39	25	2.14	ND	1.66	3.80	17.9
Bmgj1	25–38		4.3	0.58	0.27	0.40	0.85	0.35	20	25	35	1.50	ND	0.89	2.39	11.4
Bmgj2	38–61		4.2	0.23	0.20	0.16	1.18	0.14	20	56	102	2.24	ND	2.44	4.68	8.3
BC	61–86		4.3	0.05	0.04	0.15	1.00	0.12	30	70	186	2.49	ND	3.66	6.15	9.6
C	86+		4.3	ND	0.05	0.12	0.90	0.12	50	83	137	3.24	ND	1.59	4.83	6.7
Hargate																
Om	2–0		3.7	17.6	ND	ND	0.74	0.29				13.8	ND	0.5	14.3	
Ae	0–5		3.9	0.64	0.06	0.13	0.15	0.14	25	21	18	1.5	ND	4.2	5.7	13.0
Aeg	5–10		3.8	0.41	0.07	0.18	0.22	0.16	15	19	21	1.7	ND	5.5	7.2	10.5
ABg	10–16		3.9	0.50	0.41	0.18	1.8	0.22	ND	ND	ND	1.6	ND	3.8	5.4	8.7
Btgj1	16–22		4.0	0.38	0.73	0.17	2.8	0.27	100	31	63	1.6	ND	2.4	4.0	9.9
Btgj2	22–40		4.0	0.10	0.39	0.14	1.6	0.17	287	41	116	1.7	ND	2.2	3.9	10.1
Bt3	40–60		4.3	0.05	0.20	0.10	1.6	0.12	725	35	165	3.6	ND	1.3	4.9	12.2
Bt4	60–80		4.8	0.05	0.11	0.07	1.5	0.08	ND	ND	ND	4.9	ND	0.4	5.3	ND
BC	80–100		5.5	0.03	0.10	0.06	1.5	0.07	950	41	200	5.7	ND	0.0	5.7	ND
C1	100–142		6.0	0.03	0.05	0.05	1.7	0.07	1175	41	299	6.5	ND	0.0	6.5	ND
Mossy Point																
Aeg	0–20		4.2	3.30	0.10	0.28	.16	0.19	240	39	25	1.00	ND	2.5	3.50	22.5
Bg1	20–35		4.6	0.17	0.38	0.15	2.21	0.11	312	51	63	0.90	ND	1.4	2.30	10.8
Bg2	35–50		6.0	0.07	0.11	0.09	1.28	0.07	725	31	119	4.30	ND	0.0	4.30	6.3
IICkj	50+		7.0	ND	0.07	0.05	1.04	0.04	1750	35	98	3.25	ND	0.0	3.25	5.3

Table 40. Chemical properties of mineral soil profiles as percentages of oven dry weights (continued)

Horizon	Depth cm	pH H$_2$O	pH CaCl$_2$	Carbon %	Oxalate Fe %	Oxalate Al %	Dithionite Fe %	Dithionite Al %	Available ppm Ca	Available ppm K	Available ppm P	Neutral salt extra. meq/100 g (Ca + Mg)	Neutral salt extra. meq/100 g K	Neutral salt extra. meq/100 g Al	Exch. capacity meq/100 g P. charge	Exch. capacity meq/100 g CaOAc
Munn Road																
Ahegj	0-10		6.7	9.86	0.94	0.67	1.56	0.36	2000	137	35	20.1	ND	0.0	20.1	57
Bmgj1	10-31		6.4	0.35	0.07	0.04	0.27	0.04	170	12	25	1.6	ND	0.0	1.6	5
Bmgj2	31-45		not sampled													
C1	45-75		5.9	0.17	0.07	0.04	1.52	0.04	1162	66	230	5.9	ND	0.0	5.9	13
C2	75+		ND	ND	0.02	0.04	0.56	0.01	1950	29	102	4.0	ND	0.0	4.0	11
Newton																
Ap	0-20		4.0	1.33	0.32	0.14	0.75	0.06	65	51	28	1.32	ND	0.33	1.65	3.2
Ae	20-25		4.4	0.46	0.03	0.14	0.07	0.02	25	19	18	0.97	ND	0.11	1.08	1.6
Bf	25-51		4.0	2.49	0.11	0.72	1.37	0.39	20	25	32	0.71	ND	0.67	1.38	6.4
Bm	51-59		4.5	0.15	0.18	0.51	0.75	0.36	10	19	70	0.68	ND	0.22	0.90	2.4
IIC1	59-127		3.9	ND	0.23	0.17	1.83	0.12	85	70	32	0.97	ND	2.89	3.86	4.4
IIC2	127+		3.8	ND	0.07	0.18	1.75	0.13	55	74	102	0.80	ND	4.00	4.80	6.0
O'Leary																
Ap	0-20		4.5	2.20	0.50	0.21	1.08	0.06	537	43	32	4.25	ND	0.32	4.57	23
Bm	20-29		4.5	0.47	0.38	0.24	0.94	0.13	137	21	60	1.82	ND	0.54	2.36	13
Bt1	29-56		4.2	0.04	0.22	0.19	1.30	0.10	87	33	98	1.37	ND	0.89	2.26	10
Bt2	56-90		4.2	ND	0.13	0.17	1.30	0.07	62	49	158	1.73	ND	1.00	1.73	11
C	90+		4.3	ND	0.11	0.12	1.04	0.06	ND	ND	ND	1.81	ND	1.06	1.87	11
Orwell																
Apg	0-18		4.8	1.04	0.12	0.06	0.25	0.03	563	37	21	4.00	ND	0.11	4.11	5.4
Aeg	18-25		5.0	0.46	0.24	0.11	0.75	0.09	290	35	21	2.62	ND	0.11	2.73	3.5
Bg	25-48		4.8	0.09	0.24	0.15	0.85	0.12	165	31	32	1.73	ND	0.11	1.84	2.4
BCgj	48-90		4.8	0.08	0.12	0.08	1.05	0.06	195	27	53	1.77	ND	0.11	1.88	2.2
Cgj	90+		5.1	ND	0.09	0.05	0.95	0.04	150	31	70	1.67	ND	0.11	1.78	2.2
Salt Grass Point																
Ap	0-15		6.5	4.0	1.02	0.43	2.30	0.24	2000	53	25	16.8	ND	0.0	16.8	43
Aegj	15-23		6.9	0.08	0.24	0.10	0.64	0.06	1150	21	21	5.9	ND	0.0	5.9	14
Bm	23-53		7.5	0.11	0.05	0.03	1.10	0.03	2000	70	77	8.6	ND	0.0	8.6	18
Ck	53-100		7.6	tr	0.05	0.02	0.96	0.03	2000	49	49	6.7	ND	0.0	6.7	20
Tignish																
Ahe	0-10		4.0	4.0	0.43	0.11	0.97	0.28	137	27	53	3.3	ND	1.8	5.1	17.9
Ae1	10-18		4.0	0.64	0.10	0.07	0.52	0.12	30	58	74	1.5	ND	2.0	3.5	7.7
Ae2	18-28		4.0	0.41	0.18	0.14	0.73	0.16	ND	ND	ND	1.3	ND	3.0	4.3	ND
Bf	28-38		4.3	1.2	0.90	0.60	1.9	0.57	25	25	119	1.0	ND	1.4	2.4	5.0
Bt1	38-51		4.3	0.15	0.09	0.30	1.6	0.30	80	33	180	.9	ND	1.0	1.9	4.6
Bt2	51-70		4.1	0.05	0.06	0.21	1.6	0.24	ND	ND	ND	.9	ND	2.0	2.9	ND
BC1	70-92		4.1	0.04	0.03	0.18	1.5	0.21	ND	ND	ND	1.3	ND	1.8	3.1	ND
BC2	92-120		4.2	0.04	0.03	0.17	1.5	0.20	40	33	194	1.3	ND	1.5	2.8	6.1
C	137-152		4.0	ND	ND	ND	1.5	0.18	ND	ND	ND					

Table 40. Chemical properties of mineral soil profiles as percentages of oven dry weights (concluded)

Horizon	Depth cm	pH H$_2$O	pH CaCl$_2$	Carbon %	Oxalate Fe %	Oxalate Al %	Dithionite Fe %	Dithionite Al %	Available ppm Ca	Available ppm K	Available ppm P	Neutral salt extra. meq/100 g (Ca + Mg)	Neutral salt extra. meq/100 g K	Neutral salt extra. meq/100 g Al	Exch. capacity meq/100 g P. charge	Exch. capacity meq/100 g CaOAc
									Uigg							
Apgj	0–12		4.3	1.5	0.32	0.06	0.17	0.02	137	31	18	2.08	ND	0.78	2.86	5.20
Aegj	12–23		4.4	tr	0.05	0.05	0.10	0.02	40	16	18	1.12	ND	0.67	1.79	2.24
Bmgj	30–66		5.2	tr	0.05	0.13	0.40	0.08	60	19	35	1.07	ND	0.11	1.18	1.20
BC	66–100		5.7	tr	0.03	0.12	0.67	0.02	75	29	67	1.93	ND	0.11	2.04	1.60
IIC	100+		not sampled													
									West Point							
Ap	0–17		4.7	1.34	0.49	0.12	0.16	0.05	1025	17	17	5.3	ND	0.0	5.3	9.9
Bmgj1	17–30		5.2	0.25	0.24	0.14	0.04	0.00	675	25	48	3.8	ND	0.0	3.8	5.7
Bmgj2	30–60		6.2	0.12	0.09	0.04	0.60	0.37	1550	38	235	8.8	ND	0.0	8.8	10.9
C	60–100		7.1	0.01	0.02	0.03	0.07	0.04	1325	29	239	6.3	ND	0.0	6.3	9.2
									Winsloe							
Aeg1	0–13		3.7	0.80	0.03	0.07	0.08	0.03	25	29	21	2.1	ND	3.3	5.4	4.5
Aeg2	13–24		4.1	tr	0.27	0.05	0.75	0.10	25	33	21	2.5	ND	2.2	4.7	4.5
Bg	24–39		4.2	tr	0.26	0.14	1.2	0.10	25	53	32	2.5	ND	1.1	3.6	2.9
C	76+		4.1	ND	0.38	0.18	1.2	0.15	12	37	25	1.7	ND	1.7	3.4	3.2
									Wolfe Inlet							
Ahe	0–2		3.7	11.4	0.42	0.14	0.44	0.02	2000	258	42	12.6	ND	0.4	13.0	16
Aegj	2–13		3.8	0.3	0.22	0.10	0.49	0.05	125	21	18	1.1	ND	1.5	2.6	12
Abgj	13–20		4.2	0.5	0.25	0.18	0.90	0.07	175	37	32	1.1	ND	1.0	2.1	17
Bt	20–30		4.1	0.3	0.34	0.14	1.6	0.08	600	55	32	3.3	ND	1.0	4.3	22
Btgj	30–56		6.1	tr	0.20	0.05	2.2	0.05	2000	82	282	11.6	ND	0.0	11.6	27
BCk	56–78		7.2	ND	0.04	0.04	1.9	0.02	2000	53	109	11.4	ND	0.0	11.4	21
IICk	78+		7.4	ND	0.02	0.03	1.4	0.01	2000	107	137	7.7	ND	0.0	7.7	24
									Wood Island							
Aeg	0–10		4.4	0.35	0.00	0.02	0.01	0.06	50	12	11	0.6	ND	0.6	1.2	7
Aeg2	10–15		4.2	0.80	0.01	0.13	0.03	0.08	ND	ND	ND	ND	ND	ND	ND	ND
Bhgj	15–25		4.2	4.45	0.10	0.98	0.19	1.57	10	16	14	0.9	ND	3.8	4.7	39
Bfjc	25–43		4.3	0.82	0.09	0.42	0.28	0.72	10	12	32	0.3	ND	0.9	1.2	27
BCgj	43–58		4.5	0.17	0.05	0.20	0.26	0.52	10	14	53	0.3	ND	0.5	0.8	17
C1	58–72		4.3	tr	0.15	0.14	0.38	0.30	30	29	67	0.8	ND	1.3	2.1	ND
C2	72–152		4.6	ND	0.04	0.11	0.48	0.15	50	45	70	1.1	ND	1.1	2.2	ND

NOTE: ND = not determined; tr = trace noted.

Table 41. Bulk density (BD), water retention, and saturated hydraulic conductivity (K) determinations from cores of Prince Edward Island mineral soils

Horizon	Depth cm	BD g/cm^3	Water retained at tensions (kPa) 0	0.06	33 (%)	100	1500	K (cm/h)
Alberry								
Ae	5–18	1.14	51	32	28	ND	4.1	37
Bf	18–33	1.35	53	33	29	ND	7.6	21
BC1	33–53	1.54	38	27	23	ND	5.5	5.7
C	84+	1.62	34	24	21	ND	4.7	4.6
Baptist Point								
Aeg	0–10	1.32	49	41	39	35	9.2	12.2
Bg1	10–25	1.75	34	31	29	28	11.9	0.6
Bg2	25–38	1.82	32	29	28	27	11.1	0.5
Brackley								
Aegj	0–25	1.38	44.9	30.2	14.4	11.9	ND	13
Bhgj+Bmgj1	25–53	1.11	49.3	30.1	28.0	27.1	ND	38
Bmgj2	53–75	1.50	39.5	28.9	14.5	12.4	ND	6.9
IICgj	75+	1.74	30.6	26.3	20.2	18.1	ND	0.2
Bunbury								
Ae	0–18	1.59	42	21	16	14	4	1.0
Bfcj1	20–33	1.11	57	33	26	25	8	3.3
Bfcj2	33–50	1.50	39	31	26	25	7	2.1
BC1+BC2	50–101	1.79	30	21	15	14	3	1.8
C	101+	1.81	29	19	15	14	3	2.2
Carey Point								
Apgj	0–15	1.33	49	42	31	26	5.1	34
Aegj	15–29	1.53	37	28	19	16	2.6	2.5
Bmgj	29–70	1.38	43	26	22	18	4.3	24
Cgj	70–100	1.53	40	17	11	10	1.5	36
Charlottetown								
Ae	0–10	1.32	51	40	35	24	3.0	3.2
Bf	10–30	1.05	51	45	39	34	8.5	11.5
Bm1+2	30–60	1.33	47	40	36	34	8.1	0.7
Btj1	60–91	1.62	35	32	28	26	8.6	0.4
Btj3	122–163	1.86						
Culloden								
Ap	0–20	1.33	48	36	26	25	6.6	ND
Ae	20–33	1.49	39	27	14	13	2.4	ND
Bfcj	33–46	1.38	44	32	22	22	5.7	ND
C	61–99	1.92	28	24	22	21	6.5	ND
Dunblane								
Ap	0–18	1.24	51	43	39	37	13.6	32
Bm1	18–30	1.58	39	34	30	29	12.8	15
Bm2	30–50	1.62	37	33	30	28	10.0	1.6
Bm3	50–75	1.73	34	31	28	28	14.2	0.15
C1	75–100	1.58	41	38	36	32	11.1	0.1

Table 41. Bulk density (BD), water retention, and saturated hydraulic conductivity (K) determinations from cores of Prince Edward Island mineral soils (continued)

Horizon	Depth cm	BD g/cm^3	Water retained at tensions (kPa)					K (cm/h)
			0	0.06	33 (%)	100	1500	
				Dunstaffnage				
Ap	0-20	1.37	46	ND	27	ND	7.8	ND
Bf	20-30	1.32	47	ND	24	ND	7.2	ND
C1	59-90	1.52	40	ND	8	ND	2.8	ND
C2	90+	1.47	38	ND	8	ND	1.3	ND
				Duvar				
Aegj	0-17	1.56	42	36	34	34	5.9	0.6
ABgj	17-24	1.71	37	32	20	22	9.4	0.08
Bt2	32-44	1.77	32	30	27	25	8.1	0.05
C1	95-120	1.94	31	25	27	27	13.7	0.05
				Egmont				
Apg	0-15	1.20	ND	ND	ND	ND	29	1.4
Btgk	56-71	1.88	39	38	37	ND	31	0.1
Ck	91-132	1.87	43	41	41	ND	26	0.02
				Emyvale				
Ap	0-15	1.25	53	46	41	40	11.4	119
Bm1	17-30	1.44	44	36	32	31	11.1	12
				Fifteen Point				
Ap	0-13	1.22	55	44	43	42	14.0	5.0
Bm	15-20	1.45	45	39	37	36	12.3	2.5
Bt1	20-28	1.93	34	32	30	29	12.2	0.10
C	76+	1.89	33	31	29	28	18.1	0.03
				Gowanbrae				
Ap	0-24	1.09	57	42	32	28	8.5	30
Bf	28-36	1.13	54	37	31	28	6.2	19
Bm1	36-54	1.51	38	29	24	20	6.8	4.0
Bm2	54-80	1.66	33	26	23	19	7.8	2.7
IIC	80-100	1.71	31	23	17	13	7.4	2.2
				Haliburton				
Ap	0-16	1.15	53	35	31	28	8.7	195
Bf	16-36	1.23	49	39	31	28	9.8	13
Bm	36-55	1.42	40	28	22	18	8.1	11
				Haliburton Brook				
Ap	0-18	1.33	46	31	30	28	9.6	38
Bm1	18-28	1.44	41	27	24	21	7.8	24
BC1	36-51	1.73	33	29	27	25	8.1	3.4
C	96+	1.68	36	27	24	22	7.4	0.9

Table 41. Bulk density (BD), water retention, and saturated hydraulic conductivity (K) determinations from cores of Prince Edward Island mineral soils (continued)

Horizon	Depth cm	BD g/cm^3	Water retained at tensions (kPa) 0	0.06	33 (%)	100	1500	K (cm/h)
					Kildare			
Ap	0-18	1.11	55	35	30	27	7.1	1.7
Bf	25-38	1.32	49	26	21	19	10.6	9.4
Bmcj	38-61	1.52	37	24	17	15	4.7	8.0
BC	61-109	1.59	38	23	15	13	4.4	6.8
C	109+	1.52	41	26	12	8	2.0	8.6
					Locke Road			
Apg	0-18	1.21	56	44	42	40	28	70
Bg1	18-30	1.64	41	39	37	36	24	0.04
Bg2	30-60	1.80	36	34	33	31	27	0.02
C1	60-100	1.91	33	31	30	28	29	0.01
					Malpeque			
Aegj	0-18	1.39	43	40	21	18	4.7	2.2
Bfgj	18-25	1.06	56	54	34	32	10.2	2.6
Bmgj2	38-61	1.63	37	33	29	27	9.1	0.8
BC	61-86	1.75	33	30	25	23	10.9	0.8
					Margate			
Ae	0-5	1.34	50	40	38	37	7.2	1.3
Bt3	40-60	1.94	31	29	28	27	12.8	0.08
BC	80-100	1.88	30	29	28	27	10.5	0.00
					Mossy Point			
Aeg	0-20	1.14	52.1	ND	ND	ND	29.2	ND
Bg1	20-35	1.59	42.4	ND	ND	ND	21.5	ND
Bg2	35-50	1.68	33.8	ND	ND	ND	9.9	ND
IICkj	50+	1.75	32.4	26	20	18	7.4	0.3
					Munn Road			
Ahegj	0-10	0.74	67	44	43	41	27	125
Bmgj1	10-31	1.50	40	18	15	13	3.2	17
C1	45-75	1.94	30	29	29	38	14	0.01
C2	75+	1.81	31	28	25	24	4.9	0.05
					Newton			
Ap	0-20	1.30	50	31	30	27	2.1	35
Bf	25-51	1.15	53	38	35	33	7.1	12
IIC2	127+	1.71	40	38	37	37	13	0.01
					O'Leary			
Ap	0-20	1.24	49	35	35	33	12	73
Bm	20-29	1.48	43	36	32	31	9.2	4.8
Bt1	29-56	1.78	33	29	27	26	11	1.0
Bt2	56-90	1.86	29	26	25	24	12	0.09
					Orwell			
Apg	0-18	1.28	52	36	36	34	6.7	6.6
Aeg	18-25	1.66	39	34	33	32	7.1	6.1
Bg	25-48	1.72	36	32	32	30	6.7	0.7
BCgj	48-90	1.84	33	30	30	28	5.9	0.3
Cgj	90+	1.97	29	25	24	23	5.9	0.02

Table 41. Bulk density (BD), water retention, and saturated hydraulic conductivity (K) determinations from cores of Prince Edward Island mineral soils (concluded)

Horizon	Depth cm	BD g/cm^3	Water retained at tensions (kPa)					K (cm/h)
			0	0.06	33 (%)	100	1500	
					Salt Grass Point			
Ap	0-15	0.90	63	48	46	43	16	68
Aegj	15-23	1.78	31	27	25	23	8	0.3
Bm	23-53	1.86	30	27	25	24	11	0.01
Ck	53-100	2.00	27	25	22	21	10	.01
					Tignish			
Ahe	0-10	0.92	62	53	52	51	13	2.3
Bf	28-38	1.06	62	47	42	39	4	7.9
Bt1	38-51	1.58	39	31	29	28	12	2.5
Bt2	51-70	1.82	34	33	30	30	10	.2
C	137-152	1.93	31	29	28	27	9.4	.02
					Uigg			
Apgj	0-12	1.25	51	27	36	35	7.8	14
Aegj	12-23	1.67	37	28	24	23	4.2	2.3
Bmgj	30-66	1.54	41	23	20	19	3.2	13
IIC	100+	1.90	30	26	24	23	4.4	0.04
					West Point			
Ap	0-17	1.33	50	41	38	35	9.4	115
Bmgj1	17-30	1.78	32	29	27	25	11	0.14
Bmgj2	30-60	1.82	31	30	28	26	14	0.25
C	60-100	1.80	33	31	29	27	9.4	0.06
					Winsloe			
Aeg1	0-13	1.61	40	33	29	ND	ND	4.3
Aeg2	13-24	1.71	36	35	33	ND	ND	0.04
Bg	24-39	1.83	33	30	28	ND	ND	1.08
C	76+	1.78	31	25	22	ND	ND	0.08
					Wolfe Inlet			
Aegj	2-13	1.63	38	32	30	29	6.2	3.1
Bt	20-30	1.79	33	31	28	27	16.1	0.7
BCk	56-78	1.72	37	37	37	36	19.6	0.01
IICk	78+	1.99	29	25	24	23	13.5	0.13
					Wood Island			
Aeg	0-10	1.49	40	29	27	24	3.3	1.4
Bhgj	15-25	1.12	53	35	33	31	14.3	12
Bfjc	25-43	1.44	34	18	17	15	4.6	23
BCgj	43-58	1.50	37	20	22	17	3.1	16
C1	58-72	1.86	31	29	27	25	8.7	0.02
C2	72-152	1.81	30	25	23	20	6.6	0.19

*The 1500 kPa value is for disturbed samples (percentage of water by weight X bulk density of core sample). ND means no determination made.

Table 42. Minerals in the clay fraction (<2 µm) of selected horizons of four Prince Edward Island soils(5)[1]

Soil	Horizon	Chlorite	Kaolinite	Mica	expansible[2]	Montmorillonite[3]
Tignish	Ae1	0.1	0.3	0.4	0.2	0.2
	Ae2	0.3	0.1	0.3	0.3	0.2
	Bf	0.2	0.2	0.3	0.3	0.0
	Bt1	0.3	0.1	0.5	0.1	0.0
	Bt2	0.2	0.1	0.5	0.2	0.0
	BC	0.2	0.1	0.4	0.3	0.0
O'Leary	Ae	0.0	0.3	0.4	0.3	0.3
	Bf1	0.0	0.3	0.4	0.3	0.0
	Bf2	0.1	0.2	0.3	0.4	0.0
	Btj	0.0	0.3	0.4	0.3	0.0
	Bt2	0.1	0.3	0.5	0.1	0.0
	BC	0.0	0.3	0.5	0.2	0.0
Duvar	Ae	0.1	0.3	0.4	0.2	0.2
	Aeg2	0.2	0.1	0.4	0.3	0.0
	Bt1	0.1	0.2	0.5	0.2	0.0
gray streaks in	Bt1	0.3	0.2	0.5	0.0	0.0
	C	0.2	0.1	0.5	0.2	0.0
Margate	Ae	0.0	0.4	0.3	0.3	0.3
	ABg	0.1	0.2	0.5	0.2	0.0
	Bt	0.2	0.2	0.5	0.1	0.0
	C	0.1	0.2	0.7	0.0	0.0

[1] The minerals are reported as fractions (to 0.1) of the total phyllosilicates.

[2] Expansibles are those minerals such as vermiculite and some interstratified minerals but excluding montmorillonite that contract to 10°A on heating.

[3] Montmorillonite expands to 18°A on glycerol treatment and contracts to 10°A on heating to 300°C.

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APPENDIXES

Appendix 1. Definition of descriptive terms

Throughout this report frequent use is made of descriptive terms in describing features of significance within the map area. The following are definitions of some of these descriptive terms.

Soil texture

Soil separates (primary particles) on which textural classes are based are as follows:

SEPARATES	DIAMETER (mm)
Very coarse sand	2.0-1.0
Coarse sand	1.0-0.5
Medium sand	0.5-0.25
Fine sand	0.25-0.10
Very fine sand	0.10-0.05
Silt	0.05-0.002
Clay	less than 0.002
Fine clay	less than 0.0002

A further separation of sands is made according to the prevalence of different-sized sand fractions (Fig. 16a). Medium and coarse sand may contain over 25% coarse sand but over 50% fine sands. Fine sand and very fine sand must contain over 50% of the respective fine sand fractions.

The soil textural classes are grouped as follows:

- (a) Coarse textured - sand, loamy sand.
- (b) Moderately coarse textured - sandy loam, fine sandy loam.
- (c) Medium textured - very fine sandy loam, loam, silty loam, silt.
- (d) Moderately fine textured - sandy clay loam, clay loam, silty clay loam.
- (e) Fine textured - sandy clay, silty clay, clay (40-60%).
- (f) Very fine textured - heavy clay (more than 60% clay).

Soil structure and consistence

Soil structure refers to the aggregation of the primary soil particles into compound particles, or clusters of primary particles, which are separated from adjoining aggregates by surfaces of weakness. The aggregates differ in grade of development (degree of distinctness) as follows: weak, moderate, and strong. They vary in class (size) as follows: very fine, fine, medium, coarse, and very coarse. They also vary in kind (character of the faces and edges of the aggregates). The kinds mentioned in this report are as follows:

Single grain - loose, incoherent mass of individual particles as in sand.

Amorphous - coherent mass showing no evidence of any distinct arrangement of soil particles.

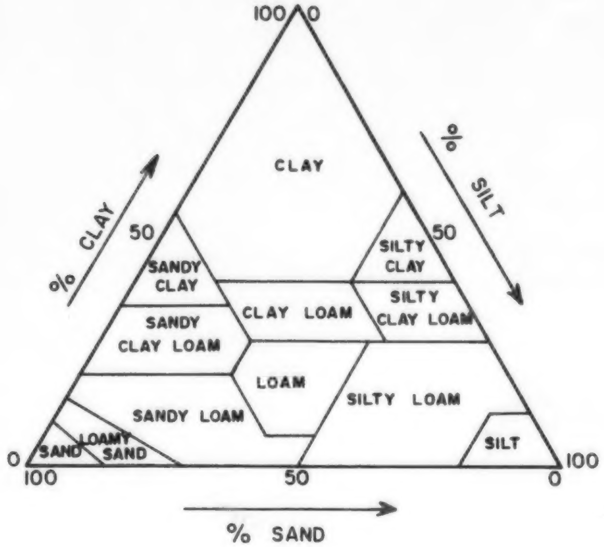

100
0
% CLAY
% SILT
50
50
CLAY
SANDY CLAY
SILTY CLAY
CLAY LOAM
SILTY CLAY LOAM
SANDY CLAY LOAM
LOAM
SILTY LOAM
SANDY LOAM
LOAMY SAND
SAND
SILT
0
100
100
50
0
% SAND

Figure 16a. A diagram showing the ranges in percentages of sand, silt, and clay in the soil textural classes.

Blocky - faces rectangular and flattened, vertices sharply angular. Subangular faces subrectangular, vertices mostly oblique, or subrounded.
Columnar - vertical edges near top of columns not sharp (columns may be flat-topped, round-topped, or irregular).
Granular - spheroidal, characterized by rounded vertices.
Platy - horizontal planes more or less developed.

Soil consistence comprise the attributes of soil materials that are expressed by the degree and kind of cohesion and adhesion or by the resistance to deformation and rupture. It deals with the strength and nature of the forces of attraction within a soil mass. The following terms are used in describing soils in this report:

Loose - noncoherent.
Friable (specific friable when moist) - soil material crushes easily under gently to moderate pressure between thumb and forefinger, and coheres when pressed together.
Firm (specifies firm when moist) - soil material crushes under moderate pressure between thumb and forefinger but resistance is distinctly noticeable.
Hard (specifies hard when dry) - moderately resistant to pressure, can be broken in the hands without difficulty but rarely breakable between thumb and forefinger.
Compact - term denotes a combination of firm resistance and a close packing or arrangement of particles.
Plastic (specifies plastic when wet) - wire formable by rolling the soil between the thumb and forefinger and moderate pressure required for deformation of the soil mass.
Sticky (specific sticky when wet) - soil adheres to both the thumb and forefinger and tends to stretch somewhat and pulls apart rather than pulling free from either digit.

Soil moisture classes

Soil moisture classes are defined in terms of (a) the actual moisture content in excess of field moisture capacity, and (b) the extent of the period during which such excess water is present in the plant root zone.

(1) Rapidly drained - soil moisture content seldom exceeds field capacity in any horizon except immediately after water additions.
(2) Well-drained - soil moisture content does not normally exceed field capacity in any horizon except possibly the C horizon, for a significant part of the year.
(3) Moderately well drained - soil moisture in excess of field capacity remains for a small but significant period of the year.
(4) Imperfectly drained - soil moisture in excess of field capacity remains in subsurface horizons for moderately long periods during the year.
(5) Poorly drained - soil moisture in excess of field capacity remains in all horizons for a large part of the year.
(6) Very poorly drained - free water remains at or within 30 cm of the surface most of the year.

Specific references to surface drainage may be designated in terms of runoff and described as high, medium, low, or ponded. Similarly, specific reference to the characteristics of horizons within the profile may be designated in terms of permeability or percolation and described as rapid, moderate, slow, very slow, and none.

Reaction classes

The reaction classes and terminology defined in the Manual for describing soils in the field (13) are as follows:

	pH(H_2O)		pH(H_2O)
Extremely acid	<4.5	Neutral	6.6-7.3
Very strongly acid	4.6-5.0	Mildly alkaline	7.4-7.8
Strongly acid	5.1-5.5	Moderately alkaline	7.9-8.4
Medium acid	5.6-6.0	Strongly alkaline	>8.5
Slightly acid	6.0-6.5		

Horizon boundaries

The lower boundary of each horizon is described by indicating its distinctness and form.

Distinctness

abrupt - less than 3 cm wide;
clear - 3 to 6 cm wide;
gradual - 6 to 12 cm wide;
diffuse - 12 cm wide.

Form

smooth - nearly a plane;
wavy - pockets are wider than deep;
irregular - pockets are deeper than wide;
broken - parts of the horizons are unconnected with other parts.

Appendix 2. Unified soil classification system

The Unified soil classification system identifies soils according to their textural and plasticity qualities and to their grouping with respect to their performances as engineering construction materials. Fig. 16b provides a description of the unified soil classification system. The following properties form the basis of soil identification:

1. Percentages of gravel, sand, and fines expressed as a percentage of the soil 76 mm equivalent diameter.
2. Shape of the grain-size distribution curve.
3. Plasticity and compressibility characteristics.

The soil is given a descriptive name and a letter symbol indicating its principal characteristics.

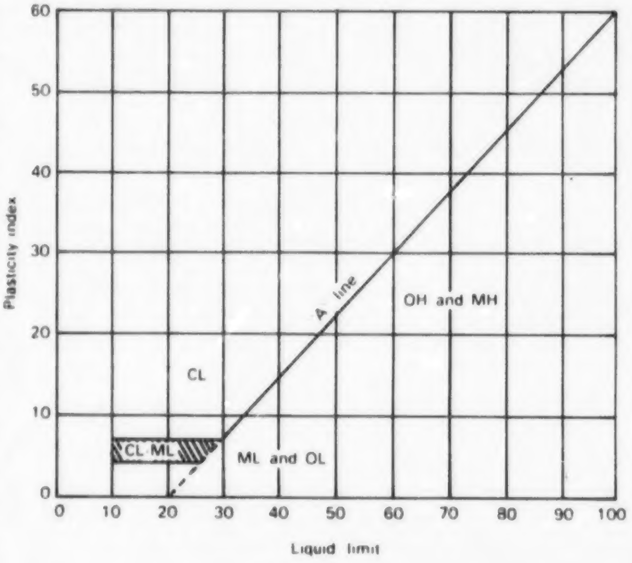
Unified Soil Classification System

Major divisions			Group symbols		Typical names	
Coarse grained soils (More than half of material is larger than No 200 sieve size)	Gravels (More than half of coarse fraction is larger than No 4 sieve size)	Clean gravels (Little or no fines)	GW		Well graded gravels, gravel sand mixtures, little or no fines	Determine percentage of sand and gravel from grain size curve. Depending on percentage of fines (fraction smaller than No 200 sieve size) coarse grained soils are classified as follows: Less than 5 per cent GW, GP, SW, SP More than 12 per cent GM, GC, SM, SC 5 to 12 per cent Borderline cases requiring dual symbols**
			GP		Poorly graded gravels, gravel sand mixtures, little or no fines	
		Gravels with fines (Appreciable amount of fines)	GM*	d	Silty gravels, gravel sand silt mixtures	
				u		
			GC		Clayey gravels, gravel sand clay mixtures	
	Sands (More than half of coarse fraction is smaller than No 4 sieve size)	Clean sands (Little or no fines)	SW		Well graded sands, gravelly sands, little or no fines	
			SP		Poorly graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount of fines)	SM*	d	Silty sands, sand silt mixtures	
				u		
			SC		Clayey sands, sand clay mixtures	
Fine-grained soils (More than half of material is smaller than No 200 sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			OL		Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH		Inorganic clays of high plasticity, fat clays	
			OH		Organic clays of medium to high plasticity, organic silts	
	Highly organic soils		Pt		Peat and other highly organic soils	

*Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterburg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less, the suffix u used when L.L. is greater than 28.

**Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example GW-GC, well graded gravel sand mixture with clay binder.

●Table from "PCA Soil Primer" 1962 Portland Cement Association, Chic. Ill.



Plasticity Chart

Figure 16b. Unified soil classification system.

Four soil fractions are recognized: cobble, gravel, sand, and fine (silt or clay).

The soils are divided as (1) coarse-grained soils, (2) fine-grained soils, and (3) highly organic soils. The coarse-grained soils contain 50%, or less, material coarser than the No. 200 sieve, and fine-grained soils contain more than 50% material finer than the No. 200 sieve. Highly organic soils can generally be identified visually.

The coarse soils are subdivided into gravel (G) and sand (S). The gravels have the greater percentage of coarse fraction (that portion retained on the No. 200 sieve) retained on the No. 4 sieve, and the sands have the greater percentage passing through the No. 4 sieve. The four secondary divisions of each group - GW, GP, and GC (gravel); SW, SP, SM, and SC (sand) - depend on the amount and type of fines and the shape of the grain-size distribution curve.*

Fine-grained soils are subdivided into silts (M) and clay (C), depending on their liquid limit and plasticity index. Silts are those fine-grained soils with a liquid limit and plasticity index that plot below the "A" line, shown in Fig. 16b, and clays are those that plot above the "A" line. The foregoing definition is not valid for organic clays because their liquid limit and plasticity index plot below the "A" line. The silt and clay groups have secondary divisions based on whether the soils have a relatively low (L) or high (H) liquid limit.

The high organic soils, usually very compressible and with undesirable construction characteristics, are classified into one group designated by the symbol Pt. Peat, humus, and swamp soils are typical examples.

Appendix 3. Methods of analyses

Chemical and physical analyses of soil profiles are given in Tables 39 to 41 inclusive in alphabetic order.

Laboratory procedures followed were generally from McKeague, J.A., ed. 1978. Manual on soil sampling and methods of analysis, 2nd ed. (11).

Soil pH was determined electrometrically on a soil-liquid slurry, using water and calcium chloride (0.01 M.$CaCl_2$).

Organic matter was determined by wet combustion, colorimetric method, and is presented as carbon percentage (27). Carbon was determined by induction furnace for the profiles, Tignish, O'Leary, Duvar, and Margate.

Iron and aluminum, oxalate and dithionite extraction were determined by procedures of McKeague and Day (28).

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*The grain-size distribution curves of well-graded materials are generally smooth and concave, with no sizes lacking and no excess of material in any size range.

Cation-exchange capacity (C.E.C) is expressed in milliequivalents per 100 g of soil (meq/100 g). Two methods were used - extraction with $Ca(OAc)_2$ - $CaCl_2$ at pH 7 and permanent charge C.E.C. by extraction with 2N NaCl after equilibration of the soil with 0.01 M $CaCl_2$. Determination of Ca, Mg, and Al was by atomic absorption.

Extractable phosphorus was by medium strength Bray method, calcium and potassium by extraction with NH_4Ac, adjusted to pH 7.

Determination for water retention (cm), bulk density (g/cm^3), and hydraulic conductivity (cm/h) were done on triplicate "undisturbed" soil cores except for the 1500 kPa determination, which was on loose samples.

Particle size was by the method in the Canada Soil Survey Committee manual. Organic matter and iron oxides were removed by pretreatments, clay was determined by pipette, sand by sieving, and silt by difference. Gravel percentage is based on the total sample, and the sand, silt, and clay percentages are based on the total fines (less than 2 mm).

Appendix 4. Interpretation of analyses

(Chemical and physical analyses of soil profiles are given in Tables 37 to 41 inclusive, in alphabetical order.)

Soil acidity

The soil reaction, (whether acid or alkaline), is expressed in pH units. The optimum over-rooting depths for cultivated soils when determined in water are 5.5 to 7.5 (medium acidic to mildly alkaline). Most of the undisturbed surface soils in the province have a pH value less than 5.0 (very strongly acid) or 4.5 (extremely acid); therefore these soils require lime at frequent intervals for most agricultural crops.

The pH measured in $CaCl_2$ is a more stable value that correlates well with the degree of base saturation in the soil. When the pH is less than 5.0 the cation exchange sites are unsaturated and hold aluminum and hydrogen ions. The pH ($CaCl_2$) is usually 0.5 unit lower than the pH(H_2O).

Organic matter

Organic matter levels of soil horizons may be calculated by multiplying carbon percentage by a conversion factor of 1.724. When forest land is cleared and plowed the supply of organic matter is reduced by decomposition, its form is changed, and organic matter levels between 2 and 6% may be established in surface-cultivated horizons. Effective bonding of mineral soil particles is best accomplished by high levels of organic matter in combination with lime and clay so that a favorable biophysical condition is created. Organic matter levels for cultivated layers of most island soils is about 3%, or less. Some coarse textured soils intensively cultivated have reached dangerously low levels of 2%, or less. Organic matter is a major source of nitrogen and of many other plant nutrients in addition to being a physical soil conditioner. Its nutritional function can be replaced by artificial fertilizers but not its physical benefits such as good structure, increased water retention capacity, and resistance to erosion.

Iron and aluminum

Amorphous or mobilized forms of Fe and Al in combination with organic matter improve the structure of the soil and raise its cation exchange capacity. The distribution of amorphous Fe and Al in the profile assist in interpreting the soil processes that produced the soil and in differentiating certain classes of soil. A proportion of Fe and Al is leached through the soil in solution and may be deposited in the B horizon as amorphous oxides in association with organic matter. The oxalate extract referred to in the data tables includes, for the most part, only amorphous oxides. The dithionite extract includes amorphous oxides and the crystalline oxides in unweathered soil material. (In some Gleysolic soils they may include mobile oxides that have recrystallized.)

Podzolic soils must have 10 cm depth of B horizon in which the percentage of oxalate extractable Fe and Al exceeds that of the C horizon by 0.8, or more. The data show that although most of the well-drained soils have podzolic B horizons, the development is not strong; this is partly due to the density of the subsoil, which restricts leaching. All the imperfectly and poorly drained soils have low levels of amorphous oxides in the B horizon; the Fe and Al removed from the A horizon have failed to accumulate in the B horizon and may have been removed by drainage waters.

Exchangeable cations and exchange capacity

The capacity of soils to hold exchangeable cations is indicative of the nutrients available for plant growth and the expected response of the soil to fertilizer applications. Organic matter, clay particles, and colloids are able to retain elements such as H, Al, Ca, Mg, K, and Na at exchange sites on their surface in the form of ions. Cations as crop nutrients are readily available to plants and can be replaced by other cations. When the pH ($CaCl_2$) is less than 5, H and Al dominate the exchange complex. When the pH is higher than 5, useful cations for crop nutrients replace the H and Al.

Permanent charge exchange capacity is a realistic measure of the effective exchange capacity and actual base saturation. The CaOAc exchange capacity includes the pH-dependent charge. All the soils have low cation-exchange capacity. Lowest values are in the coarse textured soils and the highest are in the fine textured soils and in Bh horizons of Podzols. Potassium is low in all soils and in many cases was not determined in the neutral salt extraction because it would not significantly change the exchange capacity. At low pH levels when Al ions dominate the exchange sites, the Al can be toxic to many plants.

Physical properties

Bulk density (BD) values obtained by core (Table 41) show the dense nature of the lower sola and parent materials of many soils. Water retention data are an indication of profile porosity. The lower horizons of most finer textured soils are characterized by very poor biophysical conditions, as indicated by less than 5% water between saturation and 10 kPa. The dense nature and fineness of porosity in these soils is also indicated by low hydraulic conductivity values of lower horizons. In contrast, the A and Bf horizons are moderately high as are profiles of coarse textured soils.

Mineralogy

The mineralogy was determined for only one catena represented by Tignish, O'Leary, Duvar, and Margate soils (Table 42). As reported by McKeague et al. (5), it shows comparable horizons of the four soils and similar weathering trends. Mica is the dominant mineral in the clay fraction of the BC and C horizons and in most of the other horizons of the four soils. Kaolinite occurs in all horizons, chlorite and expansible minerals in most horizons, and montmorillonite only in the Ae horizons of the four soils. Kaolinite is more abundant in the Ae horizon of three of the four soils, perhaps partly due to the dissolution of chlorite from these horizons. The general weathering trend seems to be alteration of mica to expansible minerals and further alteration of expansible minerals to montmorillonite.

Micronutrients

Some micronutrients are essential to the growth of plants and animals and a deficiency can be as serious as deficiencies of a major element. The discussion that follows has been taken from a newspaper clipping by Dr. Umesh Gupta, Research Soil Scientist, Charlottetown Research Station.

In Prince Edward Island, boron, molybdenum, and manganese are probably the most important micronutrients, from a plant-nutrition standpoint. Deficiencies of boron are found chiefly in rutabagas, forage legumes, and cole crops. A soil application of 2.2 kg/ha corrects the problem. Depending on soil tests, as much as 4.5 kg/ha soil application may be necessary for complete control of boron deficiency for rutabagas, or foliar sprays may be applied to correct the condition.

Molybdenum deficiency is common in cole crops and forage legumes. In most cases, liming the soil to pH 6.5 overcomes the problem. However, large crops such as broccoli, Brussels sprouts, and cauliflower could benefit from a foliar application. Liming the soil to an appropriate level for crops can also guard against an excess of manganese and its related toxicity problems. Small amounts of chlorine (35 to 45 kg/ha) are beneficial for tobacco, improving yields and market value of the leaf, but larger applications produce undesirable leaf qualities.

Many island soils are very low in selenium, which is not essential to crops but often results in a selenium deficiency in livestock raised on island-grown crops. Because of the danger of selenium toxicity and lack of research results, the addition of selenium to fertilizers has not been legalized. Cobalt and iodine deficiencies also occur but these have been overcome by feeding animals cobalt-iodized salt (blue salt).

Appendix 5. Names of native plants used in the text

Trees

Common name	Botanical name
1. Balsam fir	Abies balsamea (L.) Mill.
2. Balsam poplar	Populus babsamifera L.
3. Black spruce	Picea mariana (Mill.) BSP
4. Chokecherry	Prunus virginiana L.
5. Eastern white cedar	Thuja occidentalis L.
6. Eastern white pine	Pinus strobus L.
7. Grey birch, wire birch	Betula populifolia Marsh.
8. Pin cherry	Prunus pensylvanica L.f.
9. Red maple	Acer rubrum L.
10. Red spruce	Picea rubens Sarg.
11. Striped maple	Acer pensylvanicum L.
12. Sugar maple	Acer saccharum Marsh.
13. Tamarack, larch	Larix laricina (Du Roi) C.Koch
14. Trembling aspen	Populus tremuloides Michx.
15. White birch	Betula papyrifera Marsh.
16. White spruce	Picea glauca (MOENCH) Voss
17. Willow	Salix spp.
18. Yellow birch	Betula alleghaniensis Britt.

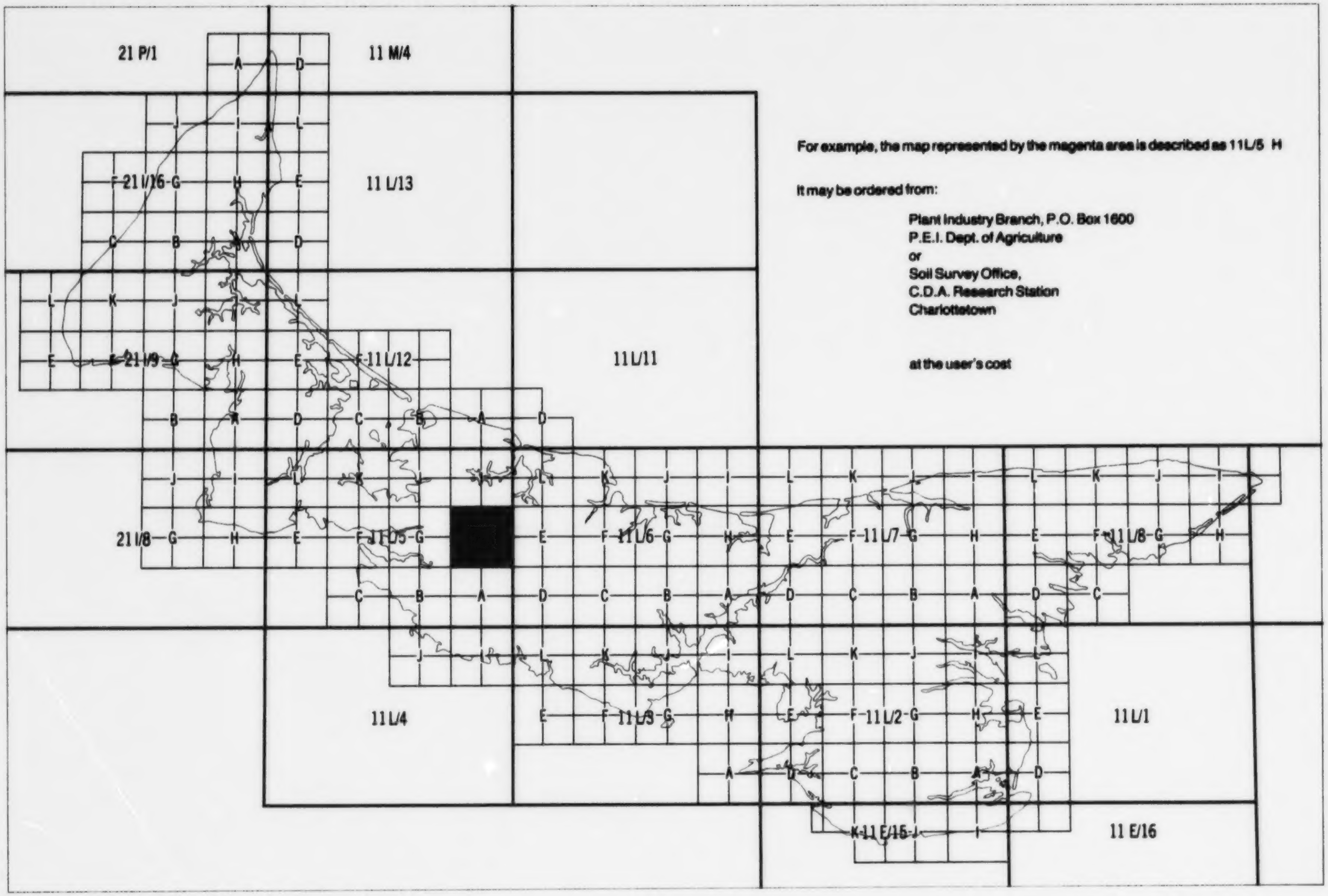
Shrubs and ground covers

Common name	Botanical name
1. Bayberry	Myrica pensylvanica Loisel.
2. Bearberry	Arctostaphylos uva-ursi (L.) K. Spreng.
3. Bracken	Pteridium aquilinum (L.) Kuhn
4. Broad-leaved cattail	Typha latifolia L.
5. Browntop	Agrostis tenuis L.
6. Bristly black currant	Ribes lacustre (Pers.) Poir.
7. Bulrush	Scirpus robustus Pursh
8. Bunchberry	Cornus canadensis L.
9. Cotton grass	Eriophorum augustifolium Honck.
10. Creeping snowberry	Gaultheria hispidula (L.) Muhlenb. ex Bige
11. Elderberry	Sambucus canadensis L.
12. Ground hemlock	Taxus canadensis Marsh.
13. Groundsel tree, sea myrtle	Baccharis halimfolia L.
14. Highbush cranberry	Viburnum trilobum Marsh.
15. Labrador-tea	Ledum groenlandicum Oedr.
16. Large cranberry	Vaccinium macrocarpon Ait.
17. Leatherleaf	Chamaedaphne calyculata (L.) Moench.
18. Lowbush blueberry	Vaccinium augustifolium Ait.
19. Marram grass	Ammophila breviligulata Fern.
20. Narrow-leaved cattail	Typha augustifolia L.
21. Pale laurel	Andromeda glaucophylla Link.
22. Pitcher plant	Sarracenia purpurea L.
23. Poverty grass, wooly hudsonia	Corema conradii (Torr.) Torr. ex Loud.
24. Red-osier dogwood	Cornus stolonifera Michx.
25. Common reed	Phragmites communis Trin.
26. Reindeer mosses	Cladonia alpestus (L.) Rabenh.

Shrubs and ground covers (Continued)

Common name	Botanical name
27. Reindeer mosses	Cladonia rangifera (L.) Web.
28. Rhodora	Rhododendron canadense (L.) Torr.
29. Saltwater cordgrass	Spartina alterniflora Loisel.
30. Wild Sarsaparilla	Aralia nudicaulis L.
31. Sheep laurel	Kalmia augustifolia L.
32. Small cranberry	Vaccinum oxycoccus L.
33. Speckled alder	Alnus rugosa (Du Roi) K. Spreng.
34. Spick grass	Distichlis spicata L.
35. Sweet gale	Myrica gale L.
36. Switch grass	Spartina patens Ait.) Muhl.
37. Three-seeded sedge	Carex trisperma Dewey
38. Twinflower	Linnaea borealis L.
39. Wild rice	Zizania aquatica L.
40. Wood fern	Dryopteris spinulosa (O.F. Müll.) D. Watt.

Appendix 6. Indexes for maps of selected soil features or of soil interpretations, and for soil maps with photobase (Figs. 17 and 18).


21 P/1
11 M/4
F-21 I/16-G
11 L/13
E-21 I/9-G
F-11 L/12
11 L/11
21 I/8-G
F-11 L/5-G
F-11 L/6-G
F-11 L/7-G
F-11 L/8-G
11 L/4
F-11 L/3-G
F-11 L/2-G
11 L/1
K-11 E/15-J
11 E/16

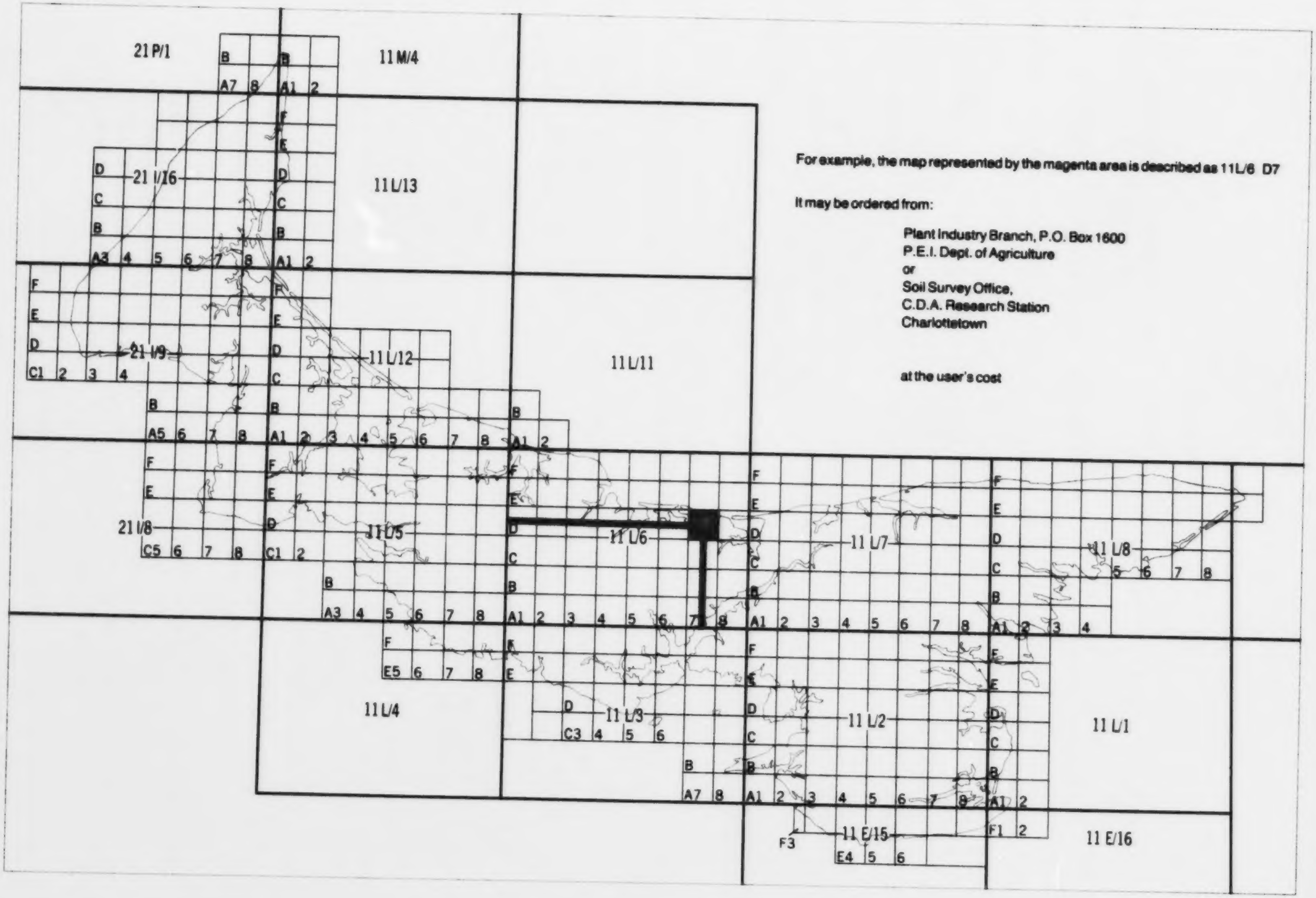
For example, the map represented by the magenta area is described as 11L/5 H

It may be ordered from:

Plant Industry Branch, P.O. Box 1600
P.E.I. Dept. of Agriculture
or
Soil Survey Office,
C.D.A. Research Station
Charlottetown

at the user's cost

Figure 17. Maps of selected soil features or of soil interpretations may be specified by using this index


21 P/1
11 M/4
21 I/16
11 L/13
21 I/9
11 L/12
11 L/11
21 I/8
11 L/5
11 L/6
11 L/7
11 L/8
11 L/4
11 L/3
11 L/2
11 L/1
11 E/15
11 E/16

For example, the map represented by the magenta area is described as 11L/6 D7

It may be ordered from:

Plant Industry Branch, P.O. Box 1600
P.E.I. Dept. of Agriculture
or
Soil Survey Office,
C.D.A. Research Station
Charlottetown

at the user's cost

Figure 18. Soil maps with photobase may be specified by using this index

GLOSSARY

This glossary defines terms commonly used in the report; it is not a comprehensive soil glossary.

aeolian deposit Material deposited by wind.

aggregate A group of soil particles cohering in order to behave mechanically as a unit.

alluvial deposit Material deposited by moving water.

alluvium Material such as clay, silt, and sand deposited by modern rivers and streams.

association, soil A group of closely interrelated soil series developed on similar parent materials and under essentially similar climates.

bulk density, soil The mass of dry soil per unit volume. The bulk volume is determined before the soil is dried to constant weight at 105°C.

cation An ion carrying a positive charge of electricity. The common soil cations are calcium, magnesium, sodium, potassium, and hydrogen.

cation-exchange capacity (C.E.C.) A measure of the total amount of exchangeable cations that can be held by the soil. It is expressed in terms of milliequivalents per 100 g of soil.

complex, soil A mapping unit on similar parent material and in which two or more defined taxonomic soils are so intermixed geographically that it is impractical, because of the scale used, to separate them.

drift Material of any sort deposited in one place after having been moved from another. Glacial drift includes all glacial deposits whether unstratified or stratified.

duff A common term for organic layers developed under imperfectly to well-drained conditions.

dune, sand A mound, or ridge, of loose sand deposited by wind.

Dystric Brunisol A great soil group in the Brunisolic order. The soils may have mull Ah horizons less than 10 cm thick. They have Bm horizons in which the base saturation (NaCl) is usually 65 to 100%, and the pH ($CaCl_2$) in the upper 25 cm is 5.5, or lower. They do not have either a Bt or a podzolic B horizon.

eluviation The transporation of soil material in suspension or in solution within the soil by the downward or lateral movement of water.

erosion The wearing away of the land surface by running water, wind, or other erosive agents. It includes both normal and accelerated soil erosion. The latter is brought about by changes on the natural cover or ground conditions and includes those due to human activity.

esker A winding ridge of irregularly stratified sand, gravel, and cobble deposited under the ice by a rapidly flowing glacial stream.

Eutric Brunisol A great soil group in the Brunisolic Order. The soils may have an Ah horizon less than 10 cm thick. They have a Bm horizon with high base saturation, as indicated by the pH, and the pH ($CaCl_2$) in the upper 25 cm is 5.5 or higher. They do not have either a Bt or a podzolic B horizon.

Fibrisol A great group of soils in the Organic order composed dominantly of fibric organic material. The material has 40%, or more, of rubbed fiber by volume and a pyrophosphate index of 5, or more.

floodplain The land bordering a stream, built up by sediments from overflow of the stream and subject to inundation when the stream is at flood stage.

frost-free period The period or season of the year between the last frost of spring and the first frost of autumn.

glaciofluvial deposits Material that has been carried, sorted, and deposited by streams derived from the melting of glaciers.

gleysation A soil-forming process, operating under poor drainage conditions, which results in the reduction of iron and other elements and in gray colors, and mottles. Those horizons in which gleying is intense are designated with the subscript g.

Gleysol A great group of soils in the Gleysolic order. They lack a well-developed, mineral-organic surface and a Bt horizon. They have a gleyed B or C horizon and they may have an organic surface horizon.

Gray Luvisol A great group of soils in the Luvisolic order occurring in moderately cool climates. They have eluviated light-colored Ae horizons and B horizons of clay accumulation (Bt). The solum is base saturated and an Ah horizon, if present, is less than 5 cm thick.

ground moraine Generally, an unsorted mixture of rocks, boulders, sand, silt, and clay deposited by glacial ice. The predominant material is unstratified drift (till), although stratified drift is present in places. The till is thought to have accumulated both by lodgment beneath the ice (ground moraine) and by being let down from the upper surface of the ice during the ice-melting process (ablation till). Ground moraine (lodgment till) occurs most commonly in the form of undulating plains that have gently sloping swells and enclosed depressions.

groundwater Water that is passing through or standing in the soil and the underlying strata and is free to move under the influence of gravity.

horizon, soil A layer in the soil profile approximately parallel to the land surface with more or less well-defined characteristics that have been produced by soil-forming processes. A soil horizon may be organic or mineral.

Humic Podzol A great group of soils in the Podzolic order. The Bh horizon is at least 10 cm thick and contains more than 1% organic carbon, less than 0.3% pyrophosphate-extractable Fe, and has a ratio of organic carbon to pyrophosphate-extractable Fe of 20, or more. The horizon is generally black and the material does not turn redder on ignition.

Humo-Ferric Podzol A great group of soils in the Podzolic order. The upper 10 cm of B horizon (Bf) contains less than 10% organic matter and enough extractable Fe and Al to satisfy the requirements of a Bf horizon.

Humisol A great group of soils in the Organic order composed of dominantly organic material. This material has less than 10% rubbed fiber content by volume and a pyrophosphate index of 3, or less.

humus That more or less stable fraction of the soil organic matter remaining after the major portion of added plant and animal residues has decomposed. Usually it is dark colored.

hydraulic conductivity The ability of the soil to transmit water, expressed as a velocity, for example centimetres per hour.

illuviation The process of depositing soil material removed from one horizon in the soil to another, usually from an upper to a lower horizon in the soil profile. Illuviated compounds include silicate clay, iron and aluminum hydrous oxides, and/or organic matter.

infiltration The downward entry of water into the soil.

intergrade A soil that possesses moderately well developed distinguishing characteristics of two or more genetically related taxa.

Kame An irregular ridge, or hill, of stratified glacial drift deposited by glacial meltwater.

kettle A depression resulting from the collapse of sediments by the melting of a block of ice buried in them.

lacustrine deposit Material deposited in lake water and later exposed either by lowering the water level or by uplifting the land.

liquid limit, upper plastic limit The water content at which a pat of soil, cut by a groove of standard dimensions, flows together for a distance of 12 mm under the impact of 25 blows in a standard liquid-limit apparatus.

Luvic Gleysol A great group of soils in the Gleysolic order. They have organic or mineral surface horizons overlying gleyed eluvial horizons, and a Btg horizon.

Mesisol A great group of soils in the Organic order composed of dominantly mesic material. This material contains 10-40% rubbed fiber by volume and has a pyrophosphate index of 3-5.

moder A zoogenous forest humus form that is made up of plant remains partly disintegrated by the soil fauna (F layer), but not matted as in raw humus, and transitional to mull. The mixing of organic and mineral particles is purely mechanical.

mor A nonzoogenous forest humus form distinguished by a matted F layer and a holorganic H layer with a sharp delineation from the A horizon. It is generally acid, having high organic matter content.

morphology, soil The makeup of a soil, including the texture, structure, consistence, color, and other physical, mineralogical, and biological properties of the various horizons of a soil profile.

mottles Spots or blotches of different color or shades of color interspersed with the dominant color. Mottling in soils usually indicates poor aeration and drainage.

mull A zoogenous forest humus form consisting of an intimate mixture of well-humified organic matter and mineral soil that makes a gradual transition to the horizon underneath. It is distinguished by its granular structure and by the activity of the burrowing microfauna (mostly earthworms). Partly decomposed organic debris does not accumulate as a distinct layer (F layer) as in mor or moder.

organic matter, soil The decomposition residues of plant material derived from (1) plant materials deposited on the surface of the soil; and (2) roots that decay beneath the surface of the soil.

orstein An indurated layer in the B horizon of Podzols in which the cementing material consists of illuviated sesquioxides and organic matter.

orthic Denotes the subgroup that typifies the central concept of the great group.

outwash Sediments washed out by flowing water beyond the glacier and laid down as stratified drift in thin forest beds. Particle size ranges from boulders to silt.

Parent material Unconsolidated mineral material or peat from which the soil profile develops.

peat Unconsolidated soil material consisting largely of undecomposed to partially decomposed organic matter accumulated under conditions of excessive moisture.

ped A unit of soil structure such as a prism, block, or granule formed by natural processes (in contrast to a clod, which is formed artificially).

pedology Those aspects of soil science involving the constitution, genesis, classification, and distribution of soils.

percolation, soil water The downward movement of water through soil; specifically, the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of 1.0, or less.

permeability The ease with which gases, liquids, or plant roots penetrate or pass through a bulk mass of soil or a layer of soil. Because different soil horizons vary in permeability, the particular horizon in question should be designated.

pH, soil A notation used to designate the relative acidity or alkalinity of soils and other materials. A pH of 7.0 indicates neutrality, higher values indicate alkalinity, and lower values acidity.

phase, soil A subdivision of a taxonomic class based on soil characteristics or a combination thereof that are considered to be potentially significant to the use and management of the soil.

plastic limit Water content at which a soil will begin to crumble when rolled into a thread approximately 3 mm in diameter.

plasticity index The numerical difference between the liquid and the plastic limit or, synonymously, between the lower plastic limit and the upper plastic limit.

profile, soil A vertical section of the soil throughout all its horizons and extending into the parent material.

relief The elevations or inequalities of the land surface when considered collectively. Minor configurations are referred to as microrelief.

series, soil In soils with horizons any profile that has a similar number and arrangement of horizons whose color, texture, structure, consistence, thickness, reaction, and composition are within a defined range, or in soils without horizons any profile that has differentiating properties, except thickness, within specified depth limits.

Solum (pl., sola) The part of the soil profile that is above the parent material and in which the processes of soil formation are active. It comprises the A and B horizons.

stratified Composed of or arranged in strata, or layers, as applied to parent materials. Layers 1 cm, or less, in thickness are referred to as laminae, whereas those thicker than 1 cm are referred to as beds.

subsoil Technically, the B horizon; broadly, the part of the profile below plow depth.

substratum Any layer lying beneath the solum, or true soil; the C and R horizons.

terrace A nearly level or undulating plain, commonly rather long and narrow, and having a steep front facing a river, lake, or sea.

till Unstratified glacial drift deposited directly by ice and consisting of clay, silt, sand, and boulders intermingled in any proportion.

tilth The physical condition of soil as related to its ease of tillage, its suitability as a seedbed, and its impedance to seedling emergence and root penetration.

variant, soil A taxonomic soil unit closely related to a soil series but differing from it by at least one characteristic at the series level. Variants are used for soil series that are not well known enough to justify being established as new series.

water-holding capacity The ability of soil to hold water. The water-holding capacity of sandy soils is usually low, whereas that of clayey soils is high.

water table (Phreatic surface; free water surface; groundwater level). Elevation at which the pressure in the soil water is zero in relation to the atmospheric pressure.

MAPS
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CARTES
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